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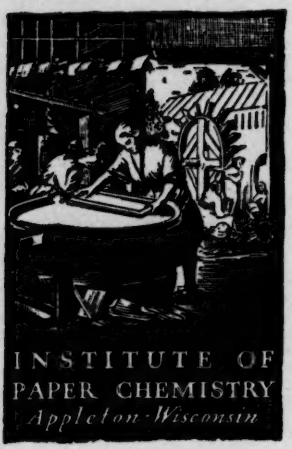
BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

MARCH • 1949

Volume 19 Number 7

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Periodicals, Books, and Pamphlets Added to the Library During February

PERIODICALS—BACK VOLUMES

Fibre Containers. v. 15-18, 1930-33.

BOOKS AND PAMPHLETS

BARK

NORTHEASTERN WOOD UTILIZATION COUNCIL, *New Haven, Conn.* The chemistry and utilization of bark; report of conference at Cambridge, Mass., September 17, 1948. Bulletin no. 25. New Haven, The Council, 1949. 133 p.

CELLULOSE

FÅHRAEUS, GÖSTA. Studies in the cellulose decomposition by *Cytophaga.* Symbolae Botanicae Upsalienses IX: 2. Uppsala, A.-B. Lundequistska Bokhandeln [1947] 128 p. + 2 plates.

CHEMISTRY, ANALYTIC—QUANTITATIVE

SANDELL, E. B. Colorimetric determination of traces of metals. New York, Interscience Publ., 1944. 487 p.

COLLOIDS

DEAN, ROBERT H. Modern colloids; an introduction to the physical chemistry of large molecules and small particles. New York, Van Nostrand, 1948.

DAIRY PRODUCTS

AMERICAN PUBLIC HEALTH ASSOCIATION AND ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. Standard methods for the examination of dairy products, microbiological, bioassay, and chemical. 9th ed. New York, American Public Health Association, 1948. 373 p.

ELECTRIC INSULATORS AND INSULATION

AMERICAN SOCIETY FOR TESTING MATERIALS. *Committee D-9 on Electrical Insulating Materials.* A.S.T.M. standards on electrical insulating materials (with related information). Specifications, methods of testing. Philadelphia, The Society, 1948. 621 p.

ELECTRONICS

MARKUS, JOHN, and ZELUFF, VIN. Handbook of industrial electronic circuits. 1st ed. New York, McGraw-Hill Book Co., 1948. 272 p.

FIBERS

BUCHER, HANS, and WIDERKEHR-SCHERB, LOUIS PIERRE. Morphology and structure of wood fibres. Attisholz/Solothurn (Switzerland), Research Laboratories of the Cellulosefabrik Attisholz AG., vorm. Dr. B. Sieber [c1948] 31 p. + 153 figures on 39 plates.

FURNACES—CONSTRUCTION

NORTHEASTERN WOOD UTILIZATION COUNCIL, *New Haven, Conn.* A home made wood burning furnace. Bulletin no. 26. New Haven, The Council, 1949. 11 p.

GLASS BLOWING AND WORKING

BARR, W. E., and ANHORN, VICTOR J. Scientific and industrial glass blowing and laboratory techniques. Pittsburgh, Instrument Publishing Co. [c1949] 388 p.

MATERIALS—DETERIORATION

ABRAMS, EDWARD. Microbiological deterioration of organic materials: its prevention and methods of test. U. S. National Bureau of Standards miscellaneous publication 188. Washington, U. S. Govt. Print. Off., 1948. 41 p.

MATTER—CONSTITUTION

RICE, FRANCIS OWEN, and TELLER, EDWARD. The structure of matter. New York, Wiley, 1949. 361 p.

METALLURGY

AMERICAN SOCIETY FOR METALS. Metals handbook, 1948 ed. Prepared under the direction of the Metals Handbook Committee, ed. by Taylor Lyman. Cleveland, The Society [c1948] 1444 p.

NEWSPRINT

KELLOGG, ROYAL S. Newsprint paper in North America. New York, The Newsprint Service Bureau [c1948] 92 p. + 2 fold. charts.

PATENT LAWS AND LEGISLATION

BIESTERFELD, CHESTER H. Patent law for lawyers, students, chemists, and engineers. 2d ed. New York, Wiley [c1949] 267 p.

RIVERS—UNITED STATES—BIBLIOGRAPHY

JONES, BENJAMIN E., and HELLAND, RANDOLPH O. Index to river surveys made by the United States Geological Survey and

other agencies, revised to July 1, 1947. U. S. Geological Survey. Water-supply paper 995. Washington, U. S. Govt. Print. Off., 1948. 145 p. + 2 fold. maps in pocket.

SILICON ORGANIC COMPOUNDS

ROCHOW, EUGENE G. An introduction to the chemistry of the silicones. New York, Wiley [c1946, 3d printing, 1947] 137 p.

STATISTICS

U. S. BUREAU OF THE CENSUS. Statistical abstract of the United States, 1948. 69th ed. Compiled under the supervision of Morris H. Hansen. Washington, U. S. Govt. Print. Off. [1948] 1054 p.

THERMOCHEMISTRY

KELLEY, K. K. Contributions to the data on theoretical metallurgy. IX. The entropies of inorganic substances. Revision (1940) of data and methods of calculation. U. S. Bureau of Mines. Bulletin 434. Washington, U .S. Govt. Print. Off., 1948. 115 p.

TRADE DIRECTORIES

PHILLIPS' paper trade directory of the world, 1949, with which is incorporated "Phillips' directory of paper makers of Great Britain and Ireland" and "Phillips' paper trade directory of the British Empire." London, S. C. Phillips & Co., c1949. 707 p.

WOOD DISTILLATION

NORTHEASTERN WOOD UTILIZATION COUNCIL, *New Haven, Conn.* A small continuous wood distillation unit. Bulletin no. 24. New Haven, The Council, 1948. 15 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ADHESIVES—TESTING

KOTTE, HANS. The bonding strength of adhesives. Neue deutsche Papier-Ztg. 3, no. 1: 10-12 (Jan. 15, 1949). [In German]

The author reviews American studies for the measurement of the bonding strength of adhesives, particularly the work by Green, Sams, and Wills (*cf.* B.I.P.C. 17: 685). E.S.

ADVERTISING

HUSTED, MARJORIE C. Consumer education. Modern Packaging 22, no. 6: 80-1, 184 (February, 1949).

A description is given of a movie which is part of General Mills' new campaign to acquaint consumers with the work involved in and the benefits derived from scientific packaging. Inserts in advertisements and radio commercials will continue the program. R.R.

WHEELWRIGHT, WILLIAM BOND. Progress in paper advertising. Paper Maker [U. S.] 18, no. 1: 1-4 (1949).

To the extent that watermarks identified a papermaker with his product or were used as trade-marks, they constituted the beginning of advertising in the industry. Decorative labels were attached to ream packages as early as the middle of the sixteenth century but, with few exceptions, paper advertising advanced little more until the beginning of the present century. Before that time, paper jobbers preferred to sell under their own brand names or watermarks. The development of paper advertising is traced to the present use of magazine and direct-mail advertising. It is conceivable that the program may be carried on within the next decade by radio and television. R.R.

ALCOHOL

CHEMICAL ENGINEERING. Alcohol & solvents. Chem. Eng. 56, no. 2: 126-7 (February, 1949); *cf.* B.I.P.C. 18: 423.

The unsettling factors in the ethyl alcohol industry are discussed; these caused a 60% reduction in its price by the end of 1948. The 1949 price is expected to be between 30-40 c./gal., so that all producers will have a selling problem throughout the year. Conditions in the production and consumption of methanol, isopropyl alcohol, higher alcohols and acetates, and methyl ethyl ketone for 1948 and 1949 are reviewed; some of these solvents were still in short supply during 1948. However, increased facilities and a stabilization of the demand have tended to foster overproduction of most of them. Unless unforeseen developments interfere, the industry will be beset with sales difficulties in 1949, the first time in a decade. Ever since 1939, the alcohol and solvents business was without major sales difficulties and price declines, and most of the period was spent allocating production. E.S.

BAGASSE

ANON. Cane sugar residues. Chemurgic Digest 8, no. 2: 10-11 (February, 1949).

Following a general description of the production of sugar syrup from cane, a discussion is given of the dry residual stalks, bagasse, and their use in the manufacture of paper, board, rayon, plastics, as a mulch and chicken litter, and as a source of industrial chemicals. Mention is also made of the use of secondary molasses in stock feed and for alcohol production and of the waxy substance covering the cane stalks for industrial purposes. R.R.

BARK

ARIES, ROBERT S. The use of bark for paper de-inking. Northeastern Wood Utilization Council, Bull. no. 25: 119-24 (January, 1949).

The author describes the Zundel process for deinking newsprint, which is commercially used in the French paper mill Cartonnerie de Kaysersberg, and which utilizes alkaline extracts of coniferous bark. The treatment is not effective for papers printed with colored inks. The bark is steamed for two hours at 6 atmospheres, ground in a suitable mill, extracted with hot or cold 10% caustic soda solution, and washed with clean soft water, which is added to the alkali extract. Dry newspapers are given an alkaline wash in this extract with proper agitation in a beater, Hydrapulper, or similar equipment at room temperature; the pulp is then dewatered to a consistency of 30% in a screw press and washed one or several times, depending upon the degree of whiteness desired. Some papers have a tendency to develop a slight yellow color, which can be corrected by the addition of small amounts of sodium bisulfite. The "black" liquor is regenerated in practice by mixing with fresh caustic soda and using the solution for extracting fresh bark. All the carbon black is retained by the bark. Commercial results indicate that, for regeneration of the liquor, 6.2% of ovendry bark and 3.25% caustic soda are used, based on the weight of the deinked newspapers. The operation can be repeated many times without a decreased washing action. The concentration of resinous soap becomes gradually higher, so that the 6.2% of fresh bark previously prescribed can be reduced. E.S.

FREIDAY, J. H. Improvement of bark burning methods thru the use of flash drying. Northeastern Wood Utilization Council, Bull. no. 25: 125-7 (January, 1949).

Brief reference is made to the Flash Dryer System developed by Combustion Engineering Co. for reducing the moisture content of bark to 45% prior to burning, thereby greatly improving the efficiency of the boiler. A full-size system is now being installed at the Great Lakes Paper Co. at Fort William, Ont.; it is designed to handle 150 tons ovendry bark per day at an initial moisture content of 63%. E.S.

HARWOOD, VICTOR D., and PURVES, C. B. Research on bark at McGill. Northeastern Wood Utilization Council, Bull. no. 25: 45-58; discussion: 58-9 (January, 1949).

White spruce bark (567 pounds) was extracted with methanol and the extract fractionated by concentrating the solution to 70-75% solids and pouring into 160% of water. The water-insoluble fraction was separated into three fractions by extracting first with ligroin and then with ether. The yields (expressed on the basis of moisture-free bark) were: 2.6% ligroin solubles, 0.4% ether solubles, and 1.5% ether insolubles. The

methanol-water soluble material was separated into 0.4% ether solubles and 15.3% ether insolubles. Separation of the ligroin-soluble fraction yielded 0.1% solid wax, 1.4% liquid wax, 0.3% fatty acids, 0.5% resin acids, and 0.1% oxidized resin acids. Saponification of the solid wax yielded 34.7% unsaponifiable material, which consisted of about 51% lignoceryl alcohol and a noncarbinol. The liquid wax consisted of 42.6% unsaponifiables associated with a liquid triglyceride and was contaminated with resin and fatty acids. The total yield of acids in the ligroin-soluble fraction was estimated as 0.94% resin acids, 0.24% saturated fatty acids, 0.2% oleic-type acids, 0.17% linoleic-type acids, and 0.07% linolenic-type acids. A fractionation of the water-soluble extract of the bark is described. The yield of reducing sugars was 0.26% before hydrolysis, and 0.42% after hydrolysis. Small amounts of pentoses, mannose, fructose, sucrose, and nonfermentable sugars were found. Tests for xylose, arabinose, rhamnose, galactose, and uronic acids were negative. In conclusion, C. H. Gleason's work (Ph. D. thesis, McGill, 1947) on white spruce bark "lignin" is abstracted. The "lignin" was isolated in 28.1% yield by extracting methanol- and cold water-extracted bark with 5% sodium hydroxide solution at room temperature. The lignin contained 5.1% ash, 3.1% pentosan, 90.2% "Klason lignin," 1.6% nitrogen, 1.5% methoxyl, 2.7% carboxyl hydroxyl groups, 13.2% total hydroxyl groups, 58.4% carbon, and 5% hydrogen. Fusion resulted in a complex mixture of unidentified substances of phenolic nature. Oxidation with nitrobenzene and alkali produced acidic, phenolic, or carbonyl-containing compounds, but no vanillin. Nitrobenzene oxidation of methylated bark lignin yielded only 0.5% vanillin. High-pressure hydrogenation experiments indicated the bark lignin to be more closely related to soil humic acid and Adkins' wood alkali lignins than to wood lignin itself. 26 references. M.A.B.

KURTH, E. F. The chemical composition of barks. Northeastern Wood Utilization Council, Bull. no. 25: 19-42; discussion: 42-4 (January, 1949); *cf.* B.I.P.C. 17: 405.

This is a reprint of the previous reference, with some additional information which has become available since the article was first published. 15 additional references. E.S.

NORTHEASTERN WOOD UTILIZATION COUNCIL. The drying of bark; a preliminary report. Northeastern Wood Utilization Council, Bull. no. 25: 129-32 (January, 1949).

After briefly describing the wet and dry weight methods of expressing moisture content of barks, a rough conversion table is presented. To avoid confusion, the method in use should always be stated. Reference is made to various methods for reducing the moisture content of waste bark (dry debarking, use of vibrating screens, bark presses, driers, and chemical treatment), as well as to methods for more intensive drying. The names of manufacturers of the various types of equipment are also listed. E.S.

RETTIE, JAMES C., and SIMMONS, FRED C. Estimates of bark supply in the Northeast. Northeastern Wood Utilization Council, Bull. no. 25: 7-18 (January, 1949).

From an analysis of available data the authors estimate that, physically, there are about 800,000 tons of bark to be had at pulp mills and sawmills of the region. No appreciable quantity of the northeastern product falls in the class of high tannin-content bark which can bear the cost of handpeeling in the woods and transportation to the processing plant. Most of the available volume is widely scattered at small plants and is so wet that a considerable expenditure would be required to dry it for use; the drier grades, on the

other hand, have real fuel value. Hence, wood-free bark is not available at low cost. A considerable amount must also be added for collection. The chemists will have to find some real values in bark before it can be utilized extensively. E.S.

ROGERS, JEROME S., and BANDEKOW, RICHARD J. Tannin from northeastern barks. Northeastern Wood Utilization Council, Bull. no. 25: 99-104, 107-8; discussion: 104-7 (January, 1949).

Of a number of waste bark samples of northeastern woods, the most promising with regard to tannin content were red spruce (13%), eastern hemlock (12%), and maple (about 9.4%). The possibilities of using the bark supplies from various mills by a co-operative bark utilization group in a central place are discussed. Emphasis is placed on the fact that the given data on tannin content and quantities of available bark have to be substantiated before definite conclusions can be drawn concerning the feasibility of the project. A bibliography of 20 references from a previous publication by Bandekow on "Present and potential sources of tannin in the United State" is appended. E.S.

SCHWARTZ, H. Structural boards from eastern cedar and western red cedar barks. Northeastern Wood Utilization Council, Bull. no. 25: 79-84; discussion 84-6 (January, 1949); *cf.* B.I.P.C. 18: 653.

The information presented in this article forms the second part of the previous reference. E.S.

VAN BECKUM, WILLIAM G. The development of bark products by Weyerhaeuser. Northeastern Wood Utilization Council, Bull. no. 25: 61-70; discussion: 70-7 (January, 1949); *cf.* B.I.P.C. 19: 380.

The development of Silvacon products from Douglas fir bark is outlined, including the raw material, the manufacturing process, and uses. E.S.

WOLF, BENJAMIN. The possible use of bark in soils. Northeastern Wood Utilization Council, Bull. no. 25: 109-14; discussion: 114-17 (January, 1949).

The possibilities of using large quantities of bark in soils for the purpose of increasing or restoring the organic matter content are discussed, particularly for areas devoted to vegetable growing. It is estimated that about half of the four million acres devoted to this purpose could stand some immediate improvement by the addition of outside organic matter. Although the use of bark available in large quantities would seem indicated, there are several drawbacks to such applications, such as serious nitrogen depletion of the soil, the pH factor in acid soils, and the large amounts of the material required which would involve prohibitive transportation costs. Suggestions for overcoming these disadvantages are given; brief reference is also made to the possibilities of bark for the control of soil erosion and from the mulch standpoint. E.S.

BARKERS AND BARKING

SANDWELL, P. R., GOUMENIOUK, G., and STEWART, R. M. Bark removal by the hydraulic method. Eng. J. 31, no. 6: 339-44 (June, 1948).

The authors outline the fundamental principles behind the hydraulic method of bark removal. The Weyerhaeuser barker, installed in 1943, one of several types of hydraulic barkers, is described, and the results obtained over 12 months' operation of a similar installation at Powell River, installed in 1946, are recorded. Savings of 10% of wood per unit of newsprint and 20% per unit of chemical pulp by this method have been effected. Less power and labor are required. The hydraulic method has gained wide acceptance among large Pacific Coast pulp and paper producers, and has proved of inestimable value to the industry. E.S.

BEECHWOOD

CHOW, K. Y. Comparative study of structure and chemical composition of tension wood and normal wood in beech (*Fagus sylvatica* L.). Forestry 20: 62-76 (1946); Brit. Abstracts A III: 428 (May, 1948). [Abstract only available]

Zinc chloro-iodide, when applied to a clean-cut end surface, stains tension wood reddish brown to purple and normal wood yellow. Tension wood contains more fibers with thicker walls and fewer and smaller vessels than does normal wood; its fibers have short discontinuous spiral markings on the walls. Tension wood has a higher specific gravity, a higher ash content, a higher content of water-soluble material, and a lower content of 1% sodium hydroxide-soluble constituents, is less highly lignified, and has a lower pentosan content than has normal wood. The molecular chain length for cellulose is greater in tension than in normal wood, and tension wood shows unusually great longitudinal shrinkage on drying. E.S.

KLAUDITZ, WILHELM. Cellulose content and chemical composition of red beechwood grown under accelerated conditions after thinning. Holzforschung 3, no. 1: 1-5 (1948). [In German]

The central portion (I) of this wood showed narrow annual rings (1-47th year), whereas the outer portion (II) (accelerated growth after thinning) showed wider rings and a far greater increment. The woods of (I) and (II) were studied morphologically and chemically, and the data compared with those for normal beechwood. (I) has a lower specific gravity, a much lower fiber content, and a much higher vessel content than has (II). The wood in (I) contained more extractives, lignin, and pentosans, and far less cellulose than did the wood in (II). L.E.W.

BOARD

ANON. Resins bond wood waste board. Modern Plastics 26, no. 6: 59-62, 146 (February, 1949).

Three different ways of producing wood-waste boards and molded shapes are described: (1) the dry process in which dry powder resin is used with dry wood waste; (2) the eastern wet process in which either a liquid resin or varnish is used with dry waste; and (3) the western wet process in which liquid resins are combined with wood waste in a wet slurry, chiefly a papermaking process. All U. S. methods are based on platen press operations. The British artificial resins process (*cf.* B.I.P.C. 18: 81) is a dry process using continuous belt pressing equipment. In (1) and (2) both phenolic and urea resins have been used successfully; in (3) only phenolic has been used. The British process uses either phenol- or cresol-formaldehyde. The merits of the boards, particularly those made by (1), as house sheathing are discussed. On platen presses, temperature recommendations for a board containing up to 10% resin are between 300 and 350° F., with 8 to 15-

minute cycles for one-inch thick sections. In (1) pressures higher than 250 to 300 p.s.i. are said to crush the fibers and reduce the strength. The cost of the board varies with the amount of resin used. Specific products, such as Plaswood, are considered. R.R.

LATHROP, E. C., and NAFFZIGER, T. R. Evaluation of fibrous agricultural residues for structural building board products. II. Fundamental studies on wheat straw fiber. Tappi 32, no. 2: 91-6 (February, 1949); *cf.* B.I.P.C. 19: 304.

A fundamental study of the relationship between the fiber properties of wheat straw and the physical characteristics of insulation boards made from them has led directly to the conclusion that wheat straw is highly suitable for the manufacture of meritorious products. Methods are described for cooking and refining wheat straw to produce mainly long fibers and also hydrated short fibers. A means of fractionating long straw fibers into various fiber lengths is described. An analysis of the physcial properties of insulating boards made from hydrated, filler, and selected long straw fiber has shown that long fibers favor the production of boards of flexural and tensile strengths higher at any comparable densities than wood fiber boards. The impact strength of such boards is two to three times that of wood boards. Tensile strength of such wheat straw boards is directly related to hydrated fiber content, whereas impact strength is directly related to fiber length, although fiber diameter may also play an important role. E.S.

OSBORNE, K. W. Board lining with aluminum foil. Paper Box Bag Maker 106, no. 4: 136 (October, 1948).

The author describes the necessary precautions when lining board with aluminum foil, cellophane or similar plastic foils, and greaseproof and glassine paper. For quality work the board must be extremely smooth, because thin foils tend to accentuate any surface irregularities, so that some converters even use clay-coated board. In order to reduce the cost of the aluminum foils, their thickness has been progressively reduced until it now amounts to one thousandth of an inch. These thin foils require special care in handling; to avoid dirty marks or scratches, a coating of clear or colored lacquer is often applied. The selection of the proper adhesive is an absolute essential, since the films vary so much in chemical composition. Drying must be done thoroughly; because the solvent adhesives cannot escape through the film, they must be forced through the board or at least be dissipated sufficiently into the board to avoid future delamination. Glassine and greaseproof papers are quite subject to dimensional changes with varying humidity, so that water-base adhesives may cause curling problems. Microcrystalline waxes reduce this tendency to a minimum. E.S.

SAECHTLING, HANSJÜRGEN. New procedures for the manufacture of building boards from cheap wood waste. Holzforschung 3, no. 1: 24 (1948). [In German] *cf.* B.I.P.C. 18: 579.

An addition to and correction of the previous article. L.E.W.

BOARD DRYING

ANON. Board machine drier boosts production. Am. Boxmaker 38, no. 2: 13-14 (February, 1949); Fibre Containers 34, no. 2: 85-7 (February, 1949); Paper Trade J. 128, no. 8: 73-4 (Feb. 24, 1949).

The Durham Paper Board Co., Rieglesville, Pa., has increased its production 10% by installing a Dravo Counterflo heater in the drier section of the machine. Large amounts of warm air are discharged at high velocity through perforated tubes running longitudinally between the drying drums. The vapors are carried off and moist air is removed more efficiently through exhaust fans in the hood covering the drier section of the machine. The increased production has more than compensated for the initial cost of installing the heater. Steam for the drying drums is supplied at 40 pounds pressure from a fuel-oil fired boiler. Warm air for the supplementary drying system comes from the Dravo Counterflo direct-fired heater which operates continuously. A booster fan increases the normal air-handling capacity of the heater to 1,500,000 Btu./hr. An illustrated description of the system is given. R.R.

BOARD MILLS—WASTE LIQUOR

IRWIN, W. Y., and FRENCH, A. H. Treatment of felt paper mill wastes. Part I. Preliminary studies. Part II. Pilot plant operation—bacterial filtration. Chem. Eng. Progress 45, no. 1: 33-8; no. 2: 119-27; discussion: 127-8 (January, February, 1949).

In the first part of the article the stream pollution problem of the felt paper mill of Congoleum-Nairn Inc. is surveyed. The mill is located in Maryland on the north branch of the Patapsco River, 20 miles northwest of Baltimore. The felt paper manufactured is somewhat similar to roofing felt, containing rags, wood pulp, and waste paper in proportions to give the felt the necessary characteristics for use as a base for Congoleum rugs and Nairn linoleum. Most of the rags are dirty and many are oily; the waste paper consists for the most part of newspapers and cartons and is usually fairly clean material. None of the processes requires chemical cooks and all are fairly simple. The mill has been able to close its water system so that, at present, only five tons of fresh water per ton of paper are required. The discharge water is pumped to lagoons, from which it is finally bled into the river. The effluent in its current volumes and pollution character has an adverse effect on the quality of the water of the Patapsco River, particularly in periods of low river flow. The proposed increase in the productive capacity of the Cedarhurst felt mill will exaggerate this effect by using more of the scant water supply and by increasing the pollution load of the plant effluent. The proposed diversion of the Patapsco River to become a major part of the municipal water supply of the city of Baltimore with the head waters of the impounding reservoir less than a mile below the felt mill sharply highlighted the desirability of developing means of purifying the mill effluent in order to minimize damage to the stream. Studies of the effluent showed that it is highly putrescible and that lagooning alone offered no solution, since the volume and time requirements in changing seasons made this angle impracticable and prohibitive. Although highly alterable by bacterial action, the effluent is relatively chemically stable and reacts but slowly, if at all, to mechanically added oxygen. Since the character of the polluting materials resembled municipal sewage in many respects, the use of a bacterial filter system was taken into consideration. In the second part of the article, the design and operation of the pilot plant and of the complete full-scale filtration plant are described, including the difficulties which had to be overcome. In its final form, the mill effluent is diverted to one of three basins, each of which will hold the entire volume discharged in one week. These basins will be on a three-week cycle of fill, rest, and discharge to the filters. The lagoon effluent at an average B.O.D. of about 2000 will be pumped to a mixing box ahead of the primary filter and

diluted with five times its volume of final filter effluent to give an entering B.O.D. of about 375. This volume will be delivered to the primary filter, 170 feet in diameter and with 6 feet of stone and provision for 8 feet, if needed. The primary filter discharges by gravity to a clarifier which, in turn, passes the water on to the secondary filter (again 170 feet in diameter) and a secondary clarifier. The outflow from the secondary sludge remover is split, with ⅔ of the total returned as diluting water to the primary filter mixing box, and the remainder of the water going through a chlorinator to storage for re-use in the plant or discharge to the stream. The sludge from the two settling basins will be pumped, if necessary, or flow by gravity, first to a thickener and then to the sludge digester. The cost of the process is calculated to amount to $23.00/ton for B.O.D. removal, which is probably high when compared with some installations; however, the present is a special case imposed by a limitation of 50 p.p.m. B.O.D. on water entering the stream, which requires in the order of 97% removal of B.O.D. Illustrations, diagrams, and tabulated data are included. E.S.

BOARD SPECIALTIES

ADDISON-SEMMES CORPORATION, *Racine, Wis.* Shipping boxes and sheet stock via pallets. Shears 67, no. 673: 40-1 (January, 1949).

The Addison-Semmes expendable pallet is made of corrugated board in various types and sizes, the standard weight being 5 to 15 pounds each. Five to nine six-inch round corrugated paper posts are secured to a sheet of 200-pound test A-flute corrugated board. Another type is similar but is made of chip or solid fiber with silicate of soda for an adhesive. The pallets have proven sound, both economically and from a materials handling point of view, for shipping knocked-down corrugated boxes and flat steel stock. In test shipments, the boxes were secured to the pallet with two to four metal bands, with a pad of corrugated or solid fiber board under the bands where they came in contact with edges of the unit load. A 1500-pound fork-lift truck can be used to move and stack the unit loads. When planning orders, 90% of the boxes should be palletized and 10% of a carload order bundled for use as blockage and dunnage in the doorway of the car. R.R.

CALCIUM CARBONATE

SIESHOLTZ, HERBERT W., and COHAN, LEONARD H. Calcium carbonate extender pigments; relation of particle size to physical properties of paints. Ind. Eng. Chem. 41, no. 2: 390-5 (February, 1949).

Five calcium carbonates were formulated and the effect of particle size on the optical properties of the dried paint films and on the rheological properties of the fluid paint was investigated. A regular increase in hiding power, lightness, and gloss of a paint film with decrease in particle size of the calcium carbonate is shown. Improvement in the above properties by the ultrafine-particle precipitated calcium carbonates appears to be a result of improved dispersion of the hiding pigment brought about by the calcium carbonate particles, which may function as grinding or antiflocculating agents. This improved dispersion increases hiding power of the paint despite the fact that the ultrafine-particle calcium carbonates have less opacity in oil than the coarser carbonates. Better dispersion of the hiding pigment is probably also partly responsible for improved gloss and lightness. 12 references. E.S.

CELLULOSE—SORPTION

BARKAS, WILFRED W. The sorption and swelling of cellulose under natural and imposed restraints. Proc. Tech. Sect. Paper Makers' Assoc. Gt. Brit. & Ireland 28, no. 1: 189-210; discussion: 211-16 (June, 1947).

After a brief outline of the molecular and micellar structure of cellulose and of the reasons for the hygroscopic nature of the individual cellulose chain molecule, a description is given of the sorption and swelling of the natural material as found in cotton, wood, and paper. It may be proved that both the sorption and swelling, resulting from a given vapor-pressure rise, must be sensitive to applied stresses. The effects of restraints arising from either internal or external causes are closely examined. It is shown that the sensitivity of sorption to stress, in a plastic material, provides a plausible explanation of the sorption hysteresis found in cellulose and other fibers. The relation between vapor pressure, moisture content, swelling, and applied directional stresses is governed by equations which may be used for calculating the elastic constants of swelling materials and for predicting their behavior under practical conditions. E.S.

CELLULOSE ESTERS—NITROCELLULOSE

JULLANDER, INGVAR, and BLOM-SALLIN, BRITA-STINA. Cross linking of nitrocellulose studied with the ultracentrifuge and consistometer. J. Polymer Sci. 3, no. 6: 804-11 (December, 1948).

It is possible to obtain gelation of solutions of cellulose derivatives by the addition of small amounts of certain di- or polyfunctional substances, which cause the formation of cross linkages between unesterified hydroxyl groups of adjacent cellulose chains. In the present study, experiments with nitrocellulose in butyl acetate solution and titanium tetrachloride as the cross-linking agent are described. The gels were examined by means of sedimentation in the ultracentrifuge and a consistometer, characterized as a rotation viscometer with continually variable speed. A brief description and one illustration of the instrument are included. The yield value of the flow curves and the extent of cross linking were studied as functions of nitrocellulose concentration, amount of cross-linking substance, and time of reaction. 11 references. E.S.

SCHERER, PHILIP C., and MASUELLI, FRANK J. Solubility of cellulose nitrate as a function of the degree of polymerization. Rayon and Synthetic Textiles 30, no. 2: 47-9 (February, 1949).

It is a well-known fact that the solubility of a cellulose nitrate is affected by time, temperature, nature of solvent, viscosity, and nitrogen content and that, of these factors, the nitrogen content seems to have the greatest influence. The present research was carried out to determine the possible effect of D.P. on solubility. A sample of cellulose nitrate was separated into a series of 12 fractions (procedures described in detail) differing in D.P., but retaining their homogeneity with regard to nitrogen content (11.88-11.98%). Each fraction was then subjected to a procedure in which nitromethane-ethanol azeotrope was used as the solvent. The percentage of soluble matter increased from 0.66% for fraction 1 to 36.08% for fraction 12; these results indicate an apparent dependence of solubility upon the length of the chain of the polymer. However, they are strictly true only for the particular sample of cellulose nitrate investigated and caution should be used in transferring the data to other samples before additional work is

done on other nitrates covering a wider range of nitrogen content. It is also pointed out that—on account of the difficulty in preparing fractions of a single homogeneous D.P.—each fraction actually represents a considerable spread of chain lengths and not one homogeneous D.P. E.S.

CHEMICALS

CHEMICAL ENGINEERING. Alkalis and chlorine. Chem. Eng. 56, no. 2: 114-15 (February, 1949); *cf.* B.I.P.C. 18: 431.

Statistical information for the production and consumption of soda ash, caustic soda, and chlorine for 1946-48 is given, supplemented by tables and diagrams. They show that soda ash production increased slightly less than 2%, caustic soda nearly 10%, and chlorine nearly 12% during 1948. The pulp and paper industry consumed 230,000 tons of soda ash, 140,000 tons of caustic soda, and 12% of the estimated total chlorine production of 1,615,000 tons. Demand and supply finally equalized in 1948; the new capacity will provide an adequate supply for 1949, which may show consumption figures above those of 1948. Among trends worth noting is the increasing interest in the mercury cell as a source of pure caustic without special purification and the search for an economic process for converting waste hydrochloric acid into chlorine. E.S.

CHEMICAL ENGINEERING. Synthetic organics. Chem. Eng. 56, no. 2: 123 (February, 1949); *cf.* B.I.P.C. 18: 432.

Synthetic organic chemicals production reached a balance between supply and demand, in most cases gradually, during 1948. This balance was achieved by expanding production to meet all requirements and not by a sharp break in demand. The first to reach this point were the manufacturers of formaldehyde. The total production of synthetic chemicals was probably about 18 billion pounds, as compared with 16 billion pounds in 1947; the total of 1949 is expected to reach 19 billion pounds. E.S.

SHALLCROSS, RUTH, and WELLS, SIDNEY D. Chemical requirements of pulping processes. Paper Ind. 30, no. 10: 1479-84 (January, 1949).

Reference is made to the lack of reliable data concerning the demand for certain chemicals used by the industry and to the need for surveys showing the raw material resources and facilities for manufacturing important chemicals, as well as the chief industrial consumers. These data should be available over a sufficiently long period so that industry requirements could be accurately established. Yearly fluctuations and the recent expansion in capacity make it hazardous to take a single year as indication of what the industry may need in the future. The total supply and demand situation of the following basic chemicals used by the industry is surveyed and availability and gaps in the data are pointed out: sulfur, sodium chloride, caustic soda, chlorine, soda ash, salt cake, and limestone. E.S.

CHROMATOGRAPHY

BURSTALL, F. H., DAVIES, G. R., LINSTEAD, R. P., and WELLS, R. A. Inorganic chromatography on cellulose. Nature 163, no. 4132: 64 (Jan. 8, 1949).

The authors give supplementary information regarding inorganic chromatography on paper and also discuss briefly the use of cellulose pulp for the separation of inorganic salts. R.R.

COLOR

WRIGHT, W. D. The limitation of color—Part V. The problem of dye mixtures. Rayon and Synthetic Textiles 30, no. 1: 82-3; no. 2: 96-7 (January, February, 1949); *cf.* B.I.P.C. 19: 309-4.

The author applies the principles of limitations of color to the problem of dye mixtures. He points out the properties required of dyes when mixed to produce a color of maximum saturation and lightness. He also indicates a method by which it is possible to derive a first idea of the relative efficiencies of different pairs of dyes. O.H.O.

COLORIMETRY

MACADAM, DAVID L. Colorimetric analysis of dye mixtures. J. Optical Soc. Am. 39, no. 1: 22-30 (January, 1949).

Distributions of chromaticities have been computed for 171 pairs of typical dyes, involving five yellows, nine cyans, and nine magentas. Beer's law was assumed, and the computations were performed on automatic, punched-card computing and tabulating machines. A selected ordinate method was used. The concentrations of the dyes in each mixture were considered to be varied systematically, so that 90 chromaticities were computed for each pair of dyes. Since each dye was used in combinations with each of as many as 18 other dyes, the results show the influence of various characteristics of spectrophotometric curves on chromaticity distribution, gamut, and luminous transmittance. Some computations were made to study the behaviors of neutral mixtures of triads of dyes when the concentrations of all components are changed by a common factor. E.S.

CONTAINER INDUSTRY

MOORE, W. CLEMENT. 12 year review of the setup paper box business. Shears 67, no. 673: 28-30 (January, 1949).

The author summarizes national surveys of the setup paper box industry made for 1936 through 1947, including both comments and statistics. Many of the statements can be applied to current business activities. R.R.

U. S. DEPARTMENT OF COMMERCE. Outlook for the packaging industry. Packaging Parade 17, no. 193: 37-9, 50-4 (February, 1949); Shears 67, no. 673: 22-5 (January, 1949).

The U. S. Department of Commerce is now issuing an *Industry Report, Containers and Packaging,* for the purpose of assisting manufacturers and consumers in planning their operations more intelligently. The information here given is taken from the first report. Of special interest is the discussion of the prospects for 1949 for the paper box industry in general and, specifically, paper and board containers, fiber containers, folding cartons, setup boxes, and fiber drums and pails. Charts and tables are included. R.R.

DIE-CUTTING

SCOTT, M. LEE. Mr. Setup Box Manufacturer: die cut your way to greater profits. Shears 67, no. 673: 21-2 (January, 1949).

The author suggests that setup boxmakers investigate the possibilities of steel rule cutting dies and the use of paperboard cut-outs as an integral part of the boxes produced. Little extra equipment is necessary, and perhaps none if printing equipment is already on hand. If space and facilities do not allow the box manufacturer to handle his own die cutting, it can be done

elsewhere by die makers and cutters at a reasonable rate. It is wise to purchase dies from a reputable die maker so that they will be available for subsequent runs. They should be entirely of hard steel, uniform in height, and level. By putting two or more units on a die, a quantity of blanks can be cut in one operation. Among the large users of die-cut setup boxes are makers of cosmetics, toys, costume jewelry, clocks, linens, and hardware. Because it is usually expensive or impractical to make changes in the cut-outs after the die is made up, it must be emphasized that the buyer submit only final production items; the boxmaker should keep the samples as proof that the dies were constructed to fit the items originally submitted. R.R.

DIGESTERS

BIRCH, I. H. Automatic steaming control for sulphate digesters. Pulp Paper Mag. Can. 50, no. 1: 104-5 (January, 1949).

The author describes a pressure-activated controller for a sulfate digester using a cam cut to a predetermined time-pressure relationship; it can be used with direct and indirect steaming. The advantages and precautions to be observed in the use and selection of this type of control are outlined. 1 diagram. E.S.

DYES AND DYEING

SCHÜRCH, A. The colouring of paper. Ciba Rev. no. 72: 2658-60 (February, 1949).

Paper stock is dyed chiefly in the beater by the addition of water-soluble colors, dissolved and strained, or finely dispersed insoluble pigments. The degree and duration of beating influence the depth of the shade, which can also be changed by the addition of color at the stuff box. The use of a size or alum fixes the dye in the fibers. Calendering, which intensifies the shade, provides the last opportunity for correcting the tint of paper. Fastness to light usually depends not only on the quality of the dyestuff but also on that of the pulp. Unbleached sulfite cellulose, wood-pulp furnishes, and their mixtures yellow with age; bleached sulfite cellulose changes but little. A discussion is given of basic dyestuffs, direct and Chlorantine fast colors, acid colors, and pigment dyes in general and some members of each group, giving their good and bad characteristics and chief uses. Dipping, a process used mainly for very thin papers, and the application of color by painting the paper surface with a brush or felt, are also described. R.R.

FIBER—IDENTIFICATION

"A.M.B." Simple paper tests for printers. Paper Market: 20 (January, 1949).

Simple tests are briefly described for differentiating between mechanical and chemical wood papers, esparto, and rag, including appearance, tear, and the use of phloroglucinol for mechanical wood and aniline sulfate for esparto papers. R.R.

FIBER—STRUCTURE

STAUDINGER, H. Macromolecular compounds. [332] Cellulose. [97] The structure of natural and synthetic fibers. Textil-Rundschau 4, no. 1: 3-17 (January, 1948). [In German]

The current knowledge and hypotheses on fiber structure are reviewed. Organic fibers are divided into three classes: the fully synthetic, such as polyesters and polyamides (or nylons); natural fibers, such as cotton,

wool, and silk; and the regenerated fibers which are obtained by chemical alteration of the natural fibrous materials. The constitution of the fully synthetic fibers in many cases can be elucidated with the same accuracy as that of low molecular-weight substances. This is not the case with the natural fibers and, consequently, with the regenerated fibers. Differences in the constitution of natural fibrous materials from different sources increase the difficulties of clarifying the structure. The evidence that the linear molecules of cellulose are unbranched is presented. By hydrolytic degradation experiments it has been shown that the native cellulose fibers become brittle when the D.P. falls below 500. Regenerated fibers, however, have acceptable physical properties as textile materials when the average D.P. is in the range of 200 to 350. This difference is attributed to the rope-like supermolecular structure of natural fibers, and also to differences in the lattice arrangement of the molecules in the fiber structure in the native and regenerated state. The newer concepts of foreign groups or weak links in the chain molecules and the effect of certain types of oxidation in sensitizing the glucose residues toward degradation are considered. The statistical shape of the thread-like cellulose molecule in the crystalline and in the amorphous portions of the fiber structure is discussed. A final section deals with the inclusion of neutral organic liquids in cellulose fibers by a series of replacement steps from the water-wet state so that a chemically reactive material results; the included organic liquid cannot be completely driven out even by long heating under high vacuum. A theoretical explanation for the phenomenom is advanced. 52 footnotes.

M.A.H.

FOLDING BOXES

ANON. Cartons for cranberries. Modern Packaging 22, no. 6: 87 (February, 1949).

The Wisconsin Cranberry Sales Co. is introducing a wax-coated, bleached solid board folding carton with a transparent acetate window for cranberries. The box has a special scooping end which permits quick manual filling and yet folds compactly for closing. The new package reduces breakage, is well adapted for refrigerator storing, and provides ample space for printed copy. Work is in progress on the development of a machine for automatic filling. R.R.

ANON. Sets that stay set. Modern Packaging 22, no. 6: 108-10 (February, 1949).

Sears, Roebuck & Co. has recently introduced a folding box for stainless steel tableware sets which is suitable for display, prevents easy break-up of sets in retail selling, and protects the contents during shipment. The container has a patented hollow wall construction of 0.025 solid kraft stock, bleached on one side and letterpress printed in red and gray. An ingenious die-cut platform, which holds the items firmly in place, consists essentially of a longitudinal "bridge" of double thickness, slotted for the insertion of fork and spoon handles in stacks and cut for knife blades, and a locking strip which is positioned beneath the bridge after the forks and spoons are in place. The container is rapidly and simply packed. Ten packages are shipped to retail outlets in corrugated shipping cases; for the mail-order trade, individual packages are placed in double sleeves. Illustrations are included. R.R.

NATIONAL BISCUIT COMPANY. Uneeda biscuit. Modern Packaging 22, no. 6: 82-6, 174, 176 (February, 1949).

An illustrated history is given of the protective package used by the company for its crackers and of the development of its brand name and

trade marks. The container was the first widely advertised protective paper package and the construction today is essentially the same as in the beginning—a sheet of waxed paper placed on a carton blank, the two folded and interfolded together as a single unit, completely enveloping the contents. Overwraps are secured with end seals. The emphasis on the brand name and trade-marks created a new respect for such property. R.R.

PAPER SALES. Food pails: low cost packaging for carry-out sales. Paper Sales 9, no. 2: 16-18, 28 (February, 1949).

Although the trend toward prepackaging is a growing one, paper salesmen should not neglect the retail stores which sell food from bulk lots for carry-out purposes. Among the most important packaging items needed by these outlets is the inexpensive easy-to-use food pail. One of the most effective sales points is the housewife's need to find foods at lower cost; bulk foods are almost invariably less expensive than those in cans. Certain foods afford greater profit to the retailer if sold in bulk rather than in packaged units. In addition, paper pails provide space for specially printed sales and advertising messages at little extra cost. In questions and answers, information is given on the construction, sizes, available designs, storage space necessary, principal markets, etc. of both food and ice cream pails. R.R.

"PRACTICO." Cartons and folding boxes—thoughts about style designing. Paper Box Bag Maker 107, no. 1: 12-13, 15 (January, 1949).

The package engineer must possess a sound general knowledge of the theory and practice of box and carton manufacture, be familiar with the application of modern printing methods, and appreciate the possibilities and limitations of the plant and the people with whom he is actively associated; he is fortunate if he possesses a natural ability to create and adapt container styles to fit any special problem. He must consider protection for the item to be packaged, the availability of board stock and the right manufacturing plant, the graphic design, and the permissible cost per unit. Each of these factors is discussed. R.R.

FOREST FIRES

ANON. Forest plantings and fires in the United States. Fibre Containers 34, no. 1: 35-6 (January, 1949).

A table and chart are presented and discussed which compare human forest planting in the United States with fire losses, showing that replanted areas are greatly exceeded by burned areas. About 83% of the forest acreage is protected. The South, with its great kraft industry, has large unprotected areas. The total area planted to date in the country is reported as 6,679,449 acres, of which 5,111,157 or 76.5% has survived. Although small landowners report the largest acreage of planting, much of this has been done with the assistance and encouragement of governmental and industrial organizations. The most successful planting group is the pulp and paper industry; 90.9% of this work was successful. A 12-year period ratio of forest area burned to new plantings indicates that the former was over six times that of the latter: 25,887,000 acres burned and 4,161,505 planted. The South, with the largest forest area, had the greatest areas burned and planted. In relationship of acres planted to acres burned, the east and west North Central states lead with 55.4% of the burned areas replanted, the Northeast is second with 26.3%, the South third with 12.5%, and the Pacific and Mountain areas follow, with 5.8% and 3.1%, respectively. The statistics are from the U. S. Forest Service. R.R.

FORESTS AND FORESTRY

HODGINS, H. J. Forest management licenses. Pulp Paper Mag. Can. 50, no. 1: 118, 120, 122 (January, 1949).

Forest management license legislation in British Columbia provides a license form of tenure that will guarantee a private individual or corporation continuous use of forest land so long as forest operations are conducted in a manner designed to provide sustained yield. It provides a system of forest taxation which holds current annual taxes on growing forests to a bare minimum and defers collection of the bulk of taxes until the time the crop is harvested. Thus, it embodies two features essential to sustained yield planning, continuous tenure and an equitable basis for taxation. Management licenses are available to small and large operators. The major features of the legislation are outlined. In the event of flagrant misuse of the license area, the Minister of Lands and Forests and the Chief Forester have almost unlimited authority to deal with performance matters to protect the public's interest. The licensee can appeal to the Lt.-Governor-in-Council in matters of a routine nature and, in case of cancellation of contract, an appeal to the courts is possible. E.S.

SCHENCK, C. A. Forestry in Germany—present and prospective. Newsprint Service Bur. Bull. no. 366: 7-8; no. 367: 2-3, 5; no. 368: 3, 5-6; no. 369: 2-3, 5-6; no. 370: 2-3, 5-7 (July 15-Nov. 16, 1948).

A detailed review including numerous tables is given of the present situation of German forests. Consideration is given to forest areas in each of the four zones and in comparison with other European countries and the United States; forest ownership; species of trees; volume of timber; reforestation; the training and work of foresters; the scarcity of tools and implements; the importance of forestry to the railroads, pulpwood industries, reconstruction, and coal mining; and the war potentialities of German forests as claimed by countries in power. In conclusion the author emphasizes the importance of forests in regard to climate, water supply, and erosion and the bleak future of German forestry and, therefore, of Germany and western Europe if present policies are continued and some of the suggestions made are carried out. R.R.

FORMALDEHYDE

CHEMICAL ENGINEERING. Formaldehyde. Chem. Eng. 56, no. 2: 146-9 (February, 1949); *cf.* abstract below.

A pictured flowsheet of the process is presented. E.S.

OLIVE, THEODORE R. Durez synthesizes formaldehyde. Chem. Eng. 56, no. 2: 130-3 (February, 1949).

An illustrated description is given of the new plant of Durez Plastics & Chemicals, Inc., at North Tonawanda, N.Y., for synthesizing formaldehyde by catalytic oxidation of methanol. The plant makes about 10,000 gallons of 37-37.5% formaldehyde or 91,000 pounds of formalin per day, which are used by the company in the production of phenol-formaldehyde resins. Process details are given. E.S.

FUNGI

PENN, WILLIAM S. Choice of plastics for export packs. Brit. Packer 11, no. 1: 24, 36 (January, 1949).

The author describes the action of fungi on the more important plastics and their constituents and the precautions which can be taken to overcome the trouble. Because the action of fungi on the various components of plastics is different, it is necessary to consider bacterial action on the components separately and then the combined effect. In some cases the tendency toward fungal sensitivity is cumulative; in others, it cancels out. In general, if the components are fungus resistant, the mix will be likewise, although this is not invariably so. Fillers of organic origin are usually susceptible. As far as can be determined, no permanent deterioration results from fungal attack, unless a cellulose filler is attacked, when it is quite possible that there would be some permanent damage. If a susceptible plastic must be used, about 2% of a fungicide should be incorporated in the plastic before molding the powders or calendering the thermoplastics. One of the best of such fungicides is salicylanilide. Before a choice of fungicide is made, it must be ascertained that it is compatible with the resin, possesses low volatility, is water insoluble, resists leaking, and is nontoxic to the skin. Fungal growth is apt to occur only where the humidity is high. R.R.

GLYCERIN

STENERSON, HARRY. Behind the markets. Chem. Eng. News 27, no. 6: 380 (Feb. 7, 1949).

In a general discussion of the outlook for glycerol, reference is made to the fact that its comparatively high cost is encouraging the consideration of cheaper materials in the manufacture of phthalic resins, wherever possible, such as other glycols and pentaerythritol. The highest quality alkyds are still obtained with fatty acids, such as stearic or oleic acids. However, lower-cost materials are being considered, tall oil being one of these. In its refined form, tall oil is a light-colored and bland oil, from which most of the sterols have been removed and in which the rosin acids have been stabilized. E.S.

GROUNDWOOD MILLS

GEHRING, C. IVES. Grinding different kinds of groundwood with three pocket grinders. Pulp Paper Mag. Can. 50, no. 2: 64-7 (February, 1949).

The general layout and equipment of the groundwood mill at Oswego Falls are described in some detail. The mill produces groundwood pulp for purposes ranging from facial, toilet, and wrapping tissue to heavy-weight board specialties in a plant equipped with eight conventional three-pocket International grinders and a selective screening or fractionating system. By an intricate arrangement of pipes and valves, the proper fractions for the various furnishes are blended and constant uniformity of the grades is maintained. E.S.

GROUNDWOOD PULP

PERRY, HENRY J. Trends in the manufacture of groundwood. Tappi 32, no. 2: 67-70 (February, 1949).

The shortage of preferred wood species, higher costs of operation, replacement costs, and obsolescence, as they affect mechanical pulping operations, are discussed. The present state of equipment and operations (as indicated by the TAPPI survey on groundwood pulping equipment) and the future possibilities of the industry are considered, the latter including pretreatments, selective screening and refining, and grinder treatments. E.S.

GUMS AND RESINS

ANON. Purified gum aids offset lithography. Rohm & Haas Reptr. 7, no. 1: 17-20 (February, 1949).

Reference is made to the use of Amberlite IR-100, a synthetic resin with ion-exchange properties, for removing the potassium, magnesium, and calcium ions from dissolved gum arabic or other plant gums. The production speed is satisfactory and the resins can be used over and over again; when they have absorbed ions to the limit of their capacity, they can be regenerated to their initial activity by rinsing with the appropriate solution. An ammonium dichromate salt is then prepared from the purified gum arabic and used for "gumming up" the thin zinc or aluminum plates employed in the deep-etch process of offset lithography. The details of the process and the method for preparing the plates are described. The purified gum arabic product was found to give sharper, more contrasting images than the natural gum or natural proteins also employed for this purpose. E.S.

HIRST, E. L., HOUGH, L., and JONES, J. K. N. Composition of the gum of *Sterculia setigera:* occurrence of D-tagatose in nature. Nature 163, no. 4135: 177 (Jan. 29, 1949).

The gum exudate of the tropical tree *Sterculia setigera* (a species of the genus from which karaya gum is obtained) is very stable to acid hydrolysis which, however, when carried out under drastic conditions, causes widespread sugar degradation. Partial hydrolysis, on the other hand, gave rise to the following components: D-galacturonic acid, L-rhamnose, and the ketose D-tagatose. The latter has never been reported previously as a constituent of natural products. L.E.W.

HARD WOODS

HYTTINEN, AXEL, and SCHAFER, E. R. The grinding of hardwoods; experiments on eastern cottonwood, yellow-poplar, sugar maple, black tupelo, white ash, paper birch and sweetgum. Pulp Paper Mag. Can. 50, no. 1: 82-90 (January, 1949); Tappi 32, no. 2: 79-85 (February, 1949).

Groundwood pulping experiments were made at the Forest Products Laboratory on seven untreated and two pretreated hardwoods at various pressures and stone surface conditions ranging from sharp to dull. Paper suitable as a base for coated groundwood book grades was made with six of the untreated hardwood groundwoods and toweling paper was made containing the untreated and pretreated groundwoods prepared from one of the species. The grinding characteristics of cottonwood and yellow poplar were similar and pulps were produced which, although they were short fibered and required considerable energy, were comparable in strength with commercial newsprint groundwood pulp. Black tupelo and sugar maple yielded pulps which were of fair strength but those from sweetgum, white ash, and paper birch were low in strength. The color of the black tupelo, yellow poplar, and white ash pulps was good, and that of cottonwood and paper birch was fair. Pulps made from sweetgum and sugar maple were dark and, unbleached, would be limited in their use. Pretreatment of paper birch wood with neutral sodium sulfite increased the strength, freeness, and fiber length of the pulp, and decreased energy consumption without affecting the color. Similar pretreatment of sweetgum caused the production of pulp with high freeness and greater fiber length at lower energy consumption than from the untreated wood but did not improve its low strength. The groundwood pulps were

mixed with bleached sulfate pulp and made into coating stock for book paper. Toweling was made from mixtures of the pretreated and untreated paper birch groundwoods with spruce groundwood and sulfite pulps. The tests indicate that, though the hardwood groundwood pulps are lower in strength than softwood groundwood pulps prepared under comparable conditions, they can be blended with stronger pulps and made into acceptable papers. Without bleaching, some of them would have limited use in the whiter papers. E.S.

HISTORY

A.L. The fan. Ciba Rev. no. 72: 2665-6 (February, 1949).

One of the oldest forms of the fan is that which the Egyptians and Assyrians made the symbol of their sovereigns. This was later adopted by the Christian church and called "flabellum." The folded paper fan is said to have been invented in 670 A.D. in Japan, from whence the Portuguese probably brought it to Europe. Descriptions and uses of fans are given. R.R.

A.L. The playing card. Ciba Rev. no. 72: 2663-5 (February, 1949).

It is thought that playing cards originated in Persia, India, or Central Asia, and were brought to Europe by the Crusaders. They were known in Germany at an early period and, by 1392, were generally used in France and Italy as well. The earliest parchment cards were soon largely replaced by the paper variety, often beautifully decorated in a technique which shows that their makers belonged to the Binders and Gilders guild. It is possible that woodcuts were used on playing cards long before they were introduced in printing. The German cards soon developed emblems of four suits: acorns, leaves, hearts, and bells, the origin of which is obscure. French emblems were adopted by the English and are those now used. Especially in Germany and France, the cards gradually lost their imaginative freshness and figures of kings, queens, and knaves became stereotyped. R.R.

BOCKWITZ, HANS H. The beginnings of multicolor letterpress printing, using white and colored papers. Das Papier 2, no. 21/22: 414-15 (November, 1948). [In German]

The author discusses the earliest known specimens of two, three, four, and multicolor letterpress printing. A paper dyer is mentioned for the first time in 1589, although the art of blueing paper for imparting a beautiful tint to printing papers was already used earlier by one Aldus Manutius in Venice; it is possible that he was the inventor of this method. E.S.

C.L. John Spilman and the paper mill at Dartford. Ciba Rev. no. 72: 2667-8 (February, 1949).

John Spilman, goldsmith to Queen Elizabeth and James I of England, established the first commercially successful British paper mill. He brought skilled workmen from Germany to operate the mill near Dartford, Kent, in about 1585, and in the following year secured a monopoly for papermaking and collecting rags. In 1605 he was knighted by James I, and in 1617 he was granted a patent for making playing cards. He died in 1626. R.R.

EDWARDS, NINA L. Problems of the pioneer papermaker. Pulp Paper Mag. Can. 50, no. 2: 55-8, 72 (February, 1949).

Papermaking in Upper Canada (Ontario) began in 1826 when a mill was founded near Dundas by James Crooks and the York Paper Mill was established near Toronto by John Eastwood and Colin Skinner. At this time

there were 185 mills in the United States. The cost of one mill was reported as $3000; the annual operating expenses were $5200 and the sales $8000. Obtaining a sufficient supply of suitable rag stock was one of the most serious problems of the pioneer industry, with the result that publishers complained of the high prices and poor quality of the domestic paper. Early Canadian papers were handmade. In the United States, domestic cylinder machines were becoming common, but early efforts to bring Fourdriniers from Europe were unsuccessful because of their high cost and imperfections. Finding competent labor was another problem. Laborers moved from one job to another and most immigrants were eager to establish themselves independently. According to the first census taken in Canada in 1850-51, there were only five mills in Upper Canada and an equal number in Lower Canada. Ten years later the number in both provinces totaled only eight, but by 1871 they had increased to 21. 16 references. R.R.

ELLIOTT, HARRISON. Some paper mill labels of antiquarian interest designed and engraved by Alexander Anderson. Paper Maker [U. S.] 18, no. 1: 7-12 (1949).

Early papermakers, realizing the value of a good appearance in the sale of their product, often used package labels. Those made by Alexander Anderson (1775-1870), the first wood engraver in the U. S., were done with accuracy and regard for their decorative value. They are of considerable historical interest as authentic portrayals of vanished paper mills, the crews at work, the equipment, and its layout. Wood engravings are distinguished from woodcuts, and seven engravings made by Anderson for use as mill labels are reproduced and discussed. In conclusion, a history of the artist's life is given. R.R.

G.F. Picture vignettes on paper wrappers. Ciba Rev. no. 72: 2668 (February, 1949).

An illustrated description is given of one of the pictures used on Venetian paper wrappers 400 years ago. R.R.

KEIM, K. Historical and technical development of papermaking. Wochbl. Papierfabr. 76, no. 12: 299-302 (December, 1948). [In German]

After briefly reviewing the earliest history of paper and its spread from China to northern Africa and from there to Europe, the author mentions the first records of papermaking in Spain, Italy, France, Switzerland, Austria, Holland, England, Russia, Scandinavia, America and Germany. The procedures used by the master and his journeymen until the beginning of the 19th century are outlined; the only raw material employed was rags. Around the year 1600, more than 200 mills were already operating in Germany, most of them with one vat, several with two, and only very few with three vats. A small paper mill with one vat employed approximately 10-15 helpers; the working day amounted usually to 14.5 hours, from 2 o'clock in the morning to 6 o'clock at night, with a rest period of 1½ hours. However, the number of working days was limited. The old papermakers observed many holidays and festivities, the journeymen many "blue Mondays." Dry summer and cold winter days brought further interruptions, so that the total per year probably did not amount to more than 250 work days. The output of the different mills and the sizes of the sheets made in each varied considerably. In the small one-vat mills, the master or owner usually supervised only the operations; he also prepared the size and did the sizing of the sheets. The vatman, couchman, and layman made the paper, and the apprentice was used for all kinds of odd jobs. Several women sorted rags and hung the finished wet sheets over ropes in the drying lofts. Each sheet was glazed or burnished by another

male worker, whereas the sorting, counting, folding, and wrapping of the sheets was again done by women. In larger mills with more than one vat, a maintenance man was also employed who had to keep the hollander beaters and stampers running and make small repairs. E.S.

LATOUR, A. Paper, a historical outline. Ciba Rev. no. 72: 2630-9 (February, 1949); Papierwereld 3, no. 13: 278-81; no. 14: 298-300 (Jan. 15, Feb. 1, 1949). [Second reference in Dutch]

An illustrated history is given of the development of writing surfaces, with emphasis on the use of paper. The author considers the invention of paper in China, its spread to Japan and Arabia, and its introduction to and gradual acceptance in European countries. R.R.

SCHAEFER, G. The development of papermaking. Ciba Rev. no. 72: 2641-8 (February, 1949).

In the early paper manufacturing process in China, the water-soaked raw material was stamped or beaten with heavy wooden pestles in stone mortars, and the pulp was poured onto a cloth stretched over a frame and dried in the sun. Although this method still prevails in some parts of China, it was soon modified by dipping a mold into the pulp and removing the wet sheet to dry, thus reducing the number of implements necessary for each worker. The Arabs used rags or flax waste as raw material and introduced the use of water power to drive a form of paper mill with stampers. In the Middle Ages and until the invention of the paper machine, the process involved sorting the rags, allowing them to rot for two or three weeks, cutting them with chopping knives, working the material in a vat hole with a water-powered hammer, and forming, couching, and drying the sheet. The absorbent unsized sheets were used for printing, and the sized sheets, rubbed with polished agates and later also with glazing hammers, were used for writing purposes. Toward the end of the seventeenth century, the hollander was invented, and in the first quarter of the eighteenth century a mechanized rag cutter came into use. The characteristics of some early papers are described. Consideration is given to the eighteenth century search for new papermaking fibers and to such developments as Keller's "wood grinder," the sulfite process, and the paper machine. Illustrations are included. R.R.

SCHAEFER, G., and LATOUR, A. The paper trade before the invention of the papermachine. Ciba Rev. no. 72: 2650-6, 2260 (February, 1949).

Because papermaking was so dependent on a good water supply, many early mills were built on the banks of rivers. The location of others was determined by proximity to institutions which needed paper. Workmen and apprentices lived with the master and worked 14 or more hours a day. The earlier mills usually contained two vats, at which 22 people worked. Later, different branches of the work were housed in separate buildings which, in the eighteenth century, developed into establishments as large as modern factories. In northern Europe the rigid guild system never won a place in the industry, because the work required specialists in several fields and it was therefore unnecessary for the manager to be a master. During the Middle Ages, the paper trade was highly organized in Italy but even here the industry could not be subject to ordinary guild rules. Until the seventeenth century, most French mills were owned by Church or lay magnates and were let to tenants; there was little chance for papermakers to become financially independent. The workmen had small chance of advancement and worked in very unhealthy conditions. By the eighteenth century, papermakers were organized and went on strike repeatedly. The idea that nothing new should be introduced led to continuous friction, such as the severe conflicts between

polishers who used agates and those working with water-driven glazing hammers. Because of the scarcity of and demand for rags, their export was forbidden and rag-picking regions were allotted by law to each mill. The amount of paper a vatman had to make in a day depended on the circumstances; in some instances it was 8 reams of 13-pound paper, 6.8 reams of 18-pound paper, and 5 reams of a still heavier product. For a long time Holland produced only coarse packing paper and imported much of its fine paper from Basle. After the Huguenot emigration from France, the Dutch industry increased greatly in scope. Until the last half of the eighteenth century, England made no pure white paper, but by the end of the century, only copperplate paper was imported from France. The article is illustrated with reproductions of early prints and a map of papermaking sites on part of the Seine River. 44 references, belonging to the three articles by Latour and Schaefer. R.R.

W.A.V. Waste paper as raw material for the paper manufacture. Ciba Rev. no. 72: 2665 (February, 1949).

A description is given of the process of Justus Claproth for the use of waste paper in papermaking. By this invention, made in 1774, he hoped to reduce the price of paper and mitigate the scarcity of raw material. The process remained unnoticed until long after his death. In a Chinese book, published in 1637 on the country's crafts, it is recorded that waste paper had been used for some time in paper manufacture. R.R.

INDEXING

TURNER, ARTHUR. Indexing and classification of technical records. Can. Chem. Process Inds. 33, no. 2: 133-7 (February, 1949).

The author examines the various systems of indexing—e.g., simple filing systems, subject classifications such as that used by T.V.A. and the decimal systems, and mechanical systems; he notes the merits and limitations of each and shows the ways in which they may be applied. A new scheme of subdivision is given for inorganic chemical technology, based on the periodic classification of the elements. Both International Business Machine and Keysort punched cards are discussed and reference is made to the notation system for organic chemistry devised by Dyson for use with the former. R.R.

INSTRUMENTATION

ARIES, ROBERT S. Modern instrumentation in the pulp and paper industry. Svensk Papperstidn. 52, no. 1: 1-18 (Jan. 15, 1949); Ind. carta (Milan) 3, no. 2: 13-20 (February, 1949). [In English; French and Swedish summaries, and in Italian]

The author describes some of the possible uses and combinations of instruments as applied in the manufacture of pulp and paper in the United States for controlling sulfur burners, acid making, cooking procedures, pulp washers, evaporators, recovery furnaces, boiler plants, causticizing and lime recovery, lime kiln operation, bleaching, size preparation, wet-end and drier operation, coating mixture preparation and application, continuous sheet moisture measurement, and water treatment. 28 figures. E.S.

JUTE

CHAKRABARTI, B. K., and NODDER, C. R. Some effects of the helical fibrillar structure of vegetable fibres. Nature 163, no. 4131: 19-20 (Jan. 1, 1949).

The authors report on their work to determine the effects of the direction of the drying twist (counter-clockwise) on breaking twist, torsional rigidity, diameter, buckling, and strength of bundles of jute fiber strands. R.R.

MUKHERJEE, R. R., SEN, M. K., and WOODS, H. J. Some tensile properties of jute. J. Textile Inst. 39, no. 7: P241-4 (July, 1948).

Young's modulus was measured on eight varieties of good commercial water-retted jute fibers in water, and the tensile strength on fibers in water and at 65% R.H. Young's modulus seems to be correlated with fineness, which accounts for the differences found between the various kinds of jute examined. The effect of specimen length on tensile strength is qualitatively in accordance with the weak-link theory, but quantitative agreement could not be established, because of an intrafiber correlation in the strengths of short specimens. The results indicate that, contrary to the view hitherto held, good quality jute is comparable in strength with the other bast fibers. E.S.

SEN, K. R. The elastic properties of single jute filaments. I. Measurement and study of Young's modulus by flexure. J. Textile Inst. 39, no. 10: T339-50 (October, 1948).

An instrument and its mode of operation are described for measuring the flexural rigidity of single filaments of jute. The results on different qualities of jute under different conditions and on fibers from jute plants at different stages of growth are discussed, supplemented by tabulated data. The following are the more important facts noted: The cross-sectional dimensions of the filaments play an essential part in the flexural elasticity of jute fibers. When the cross-sectional dimensions and R.H. are the same, the bending load is governed by the nature and structural composition of the material. For filaments with unequal dimensional characteristics, the effect of such inequality is the predominant factor influencing the bending load. The root portion of a fiber is less pliable than either the top or the middle portion. When considerable time has elapsed since batching, the bending load appears to be reduced. Variations in the values of density, mass per unit length, and Young's modulus at different stages of growth of the jute plant seem to indicate that the filaments in the pod stage undergo a dimensional contraction. In passing from the bud to the flower stage in the cycle of the plant, a relative flattening of the cross section seems also to occur. 17 references. E.S.

LIGNIN

ERDTMAN, HOLGER. The chemical nature of lignin. Tappi 32, no. 2: 71-4 (February, 1949).

At the present time lignin is considered to be a naturally occurring phenolic plastic which, together with cellulose, forms wood. A review of the chemistry of lignin, illustrated by formulas, is given. E.S.

ERDTMAN, HOLGER. Nature of the sulphite pulping reaction. Tappi 32, no. 2: 75-7 (February, 1949).

The chemistry of the sulfite pulping process is discussed in its relation to the sulfonation of lignin. Sulfonation of wood under acid conditions causes a cleavage of the acetal linkages connecting the lignin molecules with the substitution of hydroxyl groups that results in soluble groups. The constitution of lignin and its reactions are presented. E.S.

FREUDENBERG, K. Comments on the article by Schütz and coworkers. Angew. Chem. 60 A, no. 5: 125 (May, 1948). [In German] *cf.* abstract below.

The author cites various experimental proofs that lignin is preformed in wood as an aromatic compound. 13 references. F.E.B.

HAM, VIRGIL S., JR., and PALMER, GEORGE D. Lignin resins. J. Chem. Education 26, no. 2: 87-90 (February, 1949).

The authors review the many processes which have been developed for the utilization of lignin as a resin or plastic, since lignin in its natural state is not suitable for this purpose and must be made more reactive through chemical treatment. Representative examples of products obtained by thermal or acid hydrolysis, wood saccharification, and chemical condensation or polymerization are given; phenol-formaldehyde lignin resins and products obtained from alkali lignin, sulfite waste liquor lignin, and agricultural products are discussed. 44 references. E.S.

HOLMBERG, B. Lignin. XVII. Aspenwoods and mercapto acids. Arkiv Kemi, Mineral. Geol. 24 A, no. 29: 11 p. (1947). [In German]

The triploid Gigas aspen (I) has a lower lignin content (20-1%) than the common diploid aspens (II) (23%). Extraction of (I) and (II) with thioglycolic (III) and thiohydracrylic acid (IV) under various conditions gives lignothioglycolic (V) and lignothiohydracrylic acid (VI) in 70% yield of the Klason lignin. The yields of (V) and (VI) from (I) are again about 2% lower than those of (II). The yields of (VI) are lower than those of (V) because of the more drastic action of (IV) on the lignin, causing the formation of more readily soluble compounds. Aspenwood seems to contain several types of lignins, of which those with the highest methoxyl contents are most readily attacked and dissolved by (III) and (IV). F.E.B.

SCHÜTZ, FRANZ, SARTEN, PAULA, and MEYER, HEINZ. Contributions to the chemistry of wood. III. Angew. Chem. 60 A, no. 5: 115-25 (May, 1948). [In German] *cf.* B.I.P.C. 18: 95-6.

This is the same article as the previous reference. F.E.B.

MACHINERY—BLOWERS

ANON. The Sulzer Turbair vacuum pump and compressor for paper machines. Svensk Papperstidn. 51, no. 24: 588-9 (Dec. 31, 1948). [In Swedish] *cf.* B.I.P.C. 18: 524.

A brief illustrated description of the equipment is given. E.S.

MACHINERY—BOARD MACHINES

GLAUNER, EMERSON N. New equipment at Whippany Paper Board. Fibre Containers 34, no. 1: 86 (January, 1949).

The Whippany Paper Board Co., Whippany, N.J., will soon be operating its new eight-cylinder board machine, the equipment for which was delivered by Downingtown. The vats are of the Conflow type (the stock flowing countercurrent to the direction of the cylinder mold rotation), and each vat is equipped with a retractable Puette rectifier. Eight Nofome mix boxes are provided, as well as approach flow hoppers to feed the stock uniformly

to each vat. Brief reference to other special features is made. Two diagrams illustrate a side elevation and cross section of the new Conflow vat. E.S.

MERRITT, HARRY C. Construction features of "Contract unique." Fibre Containers 34, no. 1: 84-5 (January, 1949).

With reference to the two largest combination felt and linerboard machines and complete processing equipment built by the Downingtown Mfg. Co. for the United States Gypsum Co.'s mills at South Gate, Calif., and Clark, N.J., (which were described in detail in the profusely illustrated publication "Contract unique"), the author discusses a few of the unusual features of the two machines. 3 illustrations. E.S.

MACHINERY—CONVERTING MACHINERY

RONDA, E. Beading of plastic sheet. Modern Packaging 22, no. 6: 128-30 (February, 1949).

Containers of plastic sheeting may be beaded to reinforce the edges, give a more finished edge, improve the appearance, or provide a ledge for the support of a bottom or top. Machines are available which can put beading simultaneously and continuously on one or both sides of flat strips of sheeting. Suggestions for the use of beaded sheeting are described and illustrated. The ease with which plastic sheeting can be beaded probably depends on the nature of the base material, the formulation of the sheeting, its softening and melting points, and coefficient of friction between the sheeting and the forming die, the resilience of the sheeting, its uniformity of gage and average gage, its heat conductivity, and to some extent on the sheeting fabricator. Material which does not bead well should be investigated with these factors in mind and changes—some of which are suggested—made to produce a satisfactory product. However, it must be remembered that beading is only one of several desirable properties; some of the other characteristics may be affected by formulation changes made to improve beading. R.R.

TABER INSTRUMENT CORPORATION, *North Tonawanda, N.Y.* Double bead cylinder machine for plastic. Am. Boxmaker 38, no. 2: 27 (February, 1949).

A new automatic machine will bead one or both ends of thermoplastic transparent or spiral-wound paperboard cylinders simultaneously to increase the output of such equipment. Two thermostatically controlled, electrically heated dies, diametrically opposed and actuated longitudinally by a cam, are mechanically oscillated to accelerate the beading action. A series of concentric beading grooves permits work on cylinders of diameters from one-half to six inches with the same set of dies. The machine can be fed manually or automatically. An illustrated description is given. R.R.

MACHINERY—KOLLERGANG

WINTGEN, KARL. The countercurrent kollergang. Das Papier 2, no. 21/22: 405-10 (November, 1948). [In German]

A kollergang in which the roll stones move clockwise and the bedstone revolves counterclockwise is described (*cf.* German patent 733,206). The kollergang is so constructed that the bedstone can also be kept stationary. This permitted a comparative study in efficiency when the bedstone was in motion and at rest. Pulp samples were taken at stated intervals and tested periodically for breaking length, elongation, burst, and folding endurance. In no case was there evidence of hydration and it was clearly demonstrated

that the kollergang disintegrated but did not "beat" the stock. No mucilage was formed. Fibers were not injured provided that the action of the kollergang was restricted to half an hour. The revolving bedstone proved highly advantageous. It disintegrated the pulp far more rapidly than did the stationary bedstone. Thus, marked advantages were noted in the case of soda and sulfite pulps and paper broke. When soda pulp was treated in a kollergang without previous beating, all the strength properties dropped markedly, even after a short time. However, when beaten one and two hours prior to kollergang treatment, pulp strength was largely maintained. In thus maintaining pulp strength, the more efficient countercurrent kollergang also showed marked advantages. Power consumption was somewhat higher in the case of a countercurrent edgerunner, and this rose very rapidly when the pulp charge increased above a certain point (300 kg. in the case of the kollergang used by the author). Whereas a standard kollergang could process 5000 kg. of broke within 24 hours, the countercurrent type could process 8000 kg. within the same period. 12 diagrams. L.E.W.

MACHINERY—PAPER MACHINE

ANON. New machine at Bellingham. Pulp & Paper 23, no. 2: 62, 64 (February, 1949).

The capacity and quality of tissue products produced at the Bellingham mill have been increased by the addition of a new Fourdrinier machine. Monel is used throughout the machine and for pipe lines ahead of it. Other features include the General Electric electronic, centrally controlled drive and pneumatic loading on reels. The new No. 2 machine is 85 inches wide and has an average daily production of 16 tons at 950 ft./min., increasing the mill capacity from about 23 to 30-32 tons daily. Ahead of the machine is a 12-foot Shartle-Dilts Hydrapulper, the newest in the Far West. A Shartle Miami Selectifier screen, a Valley Iron Works headbox and inlet, a 100-pound 10-foot Beloit Yankee drier, and a Black-Clawson calender stack and reel are among the new installations. R.R.

ANON. New machine is already famous: Powell River's No. 8. Pulp & Paper 23, no. 2: 43-4, 46, 48, 50 (February, 1949); *cf.* B.I.P.C. 19: 249.

The new No. 8 Powell River newsprint machine, illustrations of which are included, is notable for its totally enclosed stock inlet and pressure-controlled gravity-accelerated combination flowbox and slice. Although many of the automatic controls have been previously tested at other mills, they are now combined into one integrated unit for the first time. The No. 8 machine, built by the Dominion Engineering Co., is equipped with a sectional Harland drive supplied by Bepco (Canada) Ltd. There are four Bird inward flow paper screens ahead of the machine. All concrete stock chests, flumes, and other stock preparation equipment are protected by ceramic linings. The stock-inlet pressure system is equipped with Foxboro controls. The Fourdrinier section of the machine is of a conventional removable type, with the wire tension automatically controlled by pneumatic and electric equipment. The press and drier sections, calender and reel, Harland sectional drive, Ross heating and ventilating system, and the arrangement of the equipment are described. A list of the major contractors and suppliers for the machine is appended. R.R.

MACHINERY—PRINTING MACHINE

ANON. Sheet-fed gravure for Gair cartons. Am. Boxmaker 38, no. 2: 10-12 (February, 1949); Fibre Containers 34, no. 2: 100-2

(February, 1949); Shears 67, no. 674: 40 (February, 1949); Modern Lithography 17, no. 2: 47, 49 (February, 1949); Paper Ind. 30, no. 11: 1594 (February, 1949).

The first commercial application of sheet-fed gravure printing directly on paperboard has been made by the Robert Gair Co. at its Piermont, N.Y., plant. The two new Miehle gravure presses assure absolute fidelity of reproduction on boxboard. Either single or multicolor machines are available, and printing units can be added when additional colors are desired. Automatic sheet feeding is by means of a standard Dexter stream feeder. High quality impressions are obtained through the use of forged steel cylinders for the plate and impression. The presses run at speeds of 3000 to 6000 impressions an hour. A diagram of the equipment is given. R.R.

ANON. The web offset press—its place in the lithographic industry. Natl. Lithographer 56, no. 2: 26-8, 85 (February, 1949).

The web offset press, with its ability to combine several operations in one run in addition to the usual lithographing and imprinting, meets the increasing demand for greater speed. Among its mechanical advantages are its ability to print all colors in one passage through the press and, therefore, its freedom from misregister arising from humidity changes; its ability to print on both sides of a sheet in one run; the speed with which plates can be changed; and the possibility of using more than one color with small presses. Web presses in use for 15 years are still in good condition. Certain types can be ordered one unit at a time, which may be an additional financial advantage. On new models, the paper runs off a reel and can be delivered in sheets. Any paper that is pliable enough to go around the feed rollers and turning bars can be used, but it must be made especially for the job if the best results are desired. The tendency toward offsetting has been overcome by the use of heat-set inks and chilling rollers. Cut-off accuracy varies. The diameter of the cylinders determines the length of the print, a factor which deserves full consideration by the lithographer. A pressman used to a sheet-fed press cannot get good results on a web without some additional instruction. The principal manufacturers of such equipment are given. The future of the web offset press seems promising, particularly in the newspaper, magazine, comic, and hard-bound book fields. R.R.

BLAKEMORE, FRED T. High-speed offset printing press evolved. Am. Paper Merchant 46, no. 2:27, 35 (February, 1949).

By decreasing preregister time, Miehle Printing Press and Manufacturing Co., Chicago, has developed a multicolor offset press printing at speeds of 6000 impressions (model No. 76) to 6500 impressions (model No. 61) per hour. The sheet is brought into register position while the preceding sheet is still moving off the feed board, thereby reducing the nonprinting gap between impressions from 21.5 inches to 10.5 inches. Although the size of the printing cylinder has been simultaneously reduced from a 20-inch to a 16-inch diameter, a longer register time at 6500 impressions per hour results than the previous high-speed offsets had at 5000 impressions per hour. E.S.

BLAKEMORE, FRED T. Roto press prints and coats simultaneously. Am. Paper Converter 23, no. 1: 19, 25 (January, 1949); Am. Boxmaker 38, no. 2: 24-5 (February, 1949); *cf.* B.I.P.C. 19: 325.

This is essentially the same information as given in the previous reference. R.R.

MACHINERY—ROLLS

BUCHANAN, E. T. Deflection tests—suction and top press rolls. Pulp Paper Mag. Can. 50, no. 1: 76-81 (January, 1949).

The author describes "in-the-machine" tests made to determine deflections of the rolls in two-roll suction presses of a 230-inch newsprint machine. Subsequent calculations and analyses based on these tests make it possible to predetermine the deflections and, hence, the necessary crowns of the rolls for any desired nip pressure. The theory used in analyzing the result is given, as well as an explanation of the forces acting to bend the rolls of a press, including the vacuum in a suction roll. The often expressed idea that the crowned roll in a press is the one which bends most is shown to be erroneous. The choice of nip pressure and crown distribution between rolls is a matter for the operator to decide; however, there are sound practical and theoretical reasons to show that crown should be distributed to give a nearly straight-line nip. The present method of predicting roll deflections and roll crowns should remove another "hit-and-miss" factor from the operator's problems and assist him in obtaining better production. E.S.

MACHINERY—SCREENS

BRECHT, W., and SCHRÖTER, H. Investigations with a centrifugal screen. Experimental part of the study "Wet screening (fine screening) of pulps in the paper industry." Wochbl. Papierfabr. 76, no. 11: 261-7; no. 12: 291-6 (November, December, 1948). [In German] *cf.* B.I.P.C. 16: 451-2; 18: 681.

The operating principle of the ordinary horizontal centrifugal screen is compared with that of the submerged type, which the authors call a counter-pressure screen (I). An experimental screen (I) was constructed and the influence of the quantity of throughput, dilution, r.p.m. of screen shaft, head of accepted stock and tailings, and diameter of screen holes (no slits were being used) on the efficiency of (I) was studied; only groundwood pulp was employed in the investigations. The following results are reported: The relative throughput of (I) is highest when the practically possible maximum quantities are fed to the screen, although the retention of tailings decreases somewhat in this case. With increasing dilution, the screen passes larger quantities of accepted stock and tailings. The highest throughput involves, therefore, large, and the best retention of tailings, slight dilutions. The effect of changes in dilution depends, to a certain extent, upon the r.p.m. of the screen; only above a certain figure does an increase in dilution result in an increased passage of tailings. An increase in the r.p.m. of the shaft results in a higher throughput and in a decrease in the retention of tailings. By varying the heads on the accepted stock and tailings, the screen can be made to deliver either cleaner stock or a smaller amount of tailings. The different screen holes of 1, 1.4, and 1.75 mm. employed in the present experiments indicate an increase in throughput of both accepted stock and tailings with the larger sizes. The most efficient screening operation will result when the holes are just sufficiently large to permit the passage of the maximum of accepted stock and yet sufficiently small to prevent the passage of tailings. Screening is essentially a filtration process, which results not only in the separation of the stock into accepted stock and tailings, but which also involves a structural segregation and, hence, a change in the technological properties of the accepted stock. The latter consists chiefly of fine and short-fibered fractions when the screening action is mild and aimed at the complete removal of the tailings. When the action of the screen is intensified, the percentage of long fibers in the accepted stock increases appreciably, resulting

in a freer pulp. Sample sheets prepared from such pulps show higher values for tear-through and folding endurance. Rescreening of the tailings should aim at the recovery of as many of the well-preserved long fibers as possible and these should be added to the accepted stock. Another complication during screening is the change in concentration resulting from dewatering, particularly with regard to the tailings fraction. Under unfavorable conditions, a sudden thickening of the tailings may cause serious operating troubles in the entire screening process. The correct ratio of length of screen to its diameter, the use of sufficiently large screening surfaces, proper dilution, not too high r.p.m. values, and limiting the head of the tailings to the lowest possible figure will help to prevent such occurrences. The tendency of flat and centrifugal screens for sudden segregation is compared. In summarizing the efficiencies of the two types of screens, it is stated that a satisfactory retention of tailings on a flat screen can be accomplished only at the expense of throughput, whereas (I) will still give excellent results when the quantities handled are considerably increased. A flat screen should be used only where lower quality demands do not justify the higher power consumption involved in the more complicated centrifugal screen. (I) should be selected whenever high quality is required and large quantities have to be handled. In conclusion, the authors point to the need for repeating the present laboratory experiments on a mill scale. 10 references. E.S.

MATERIALS HANDLING

DRAKE, ALBERT B. Integrating packaging with materials handling. Fibre Containers 34, no. 1: 80-3 (January, 1949).

Up to the point of final sale the basic considerations in package design are product protection, economy, and feasibility of storage and handling. The packaging engineer must consider primarily the materials-handling movements his package will encounter before it reaches its final destination. Palletizing should be employed wherever possible because of its numerous economies. The square carton, which does not lend itself well to palletization or stacking, is much less desirable than a brick-shaped package. A container which is easily stacked on a 40 × 48-inch pallet is convenient, inasmuch as this seems to be the standard size for pallets. In an experimental palletized shipment, it was found that stowage time was reduced by over 80%. If the largest practical unitized load were always used, present warehouse rates could be cut by as much as two thirds, service could be speeded up, and damage and pilferage decreased. The author advises packagers to consider a domestic pack which can be readily converted to an overseas or wartime pack. R.R.

HAWKINS, G. L. Centralized transportation system for a pulp and paper mill. Tappi 32, no. 2: 63-6 (February, 1949).

Electric trucks and a centralized transportation control can be used to advantage in the pulp and paper industry, but whether or not they can be used successfully depends to a large degree on the design and layout of the plant. Consideration must be given to the condition of the floors, widths of aisles and doorways, distances, building locations, types of materials handled, etc. The type and design of the transporting unit are dependent on the service to which it is to be applied. Considerable savings in labor can be effected; citing the experiences of his company, the author indicated a saving of about 40% in direct labor for warehousing and shipping operations. Because of the large number of trucks in use, it was considered advisable to set up a transportation system at the author's mill, which is charged with the maintenance and distribution of all carrying units. This permits adequate servicing of all departments since trucks can be assigned

to those points where their use is essential. Otherwise, there may be locations in which equipment is idle while, in others, the need for it is urgent. E.S.

METERS AND RECORDERS

ENGLER, KURT. Power economy and steam-gage installations in paper and pulp mills. Das Papier 2, no. 21/22: 410-14 (November, 1948). [In German]

Inasmuch as heat and power economy in pulp and paper mills has a marked influence on the costs of production, heat losses must be prevented by constant and adequate controls obtained by the installation of strategically placed suitable measuring devices. Steam gages serve in this capacity and their adequate installation is discussed in some detail, with the help of schematic diagrams. 26 references. L.E.W.

MICROSCOPY (ELECTRON)

EARLE, MARSHALL D., and MINKIN, JEAN A. Laboratory techniques; a new method of sectioning synthetic fibers with the ultra-microtome for examination with the electron microscope. Textile Research J. 19, no. 1: 36-41 (January, 1949).

A method has been devised in which a piece of rayon or nylon yarn, consisting of 10 or 20 single filaments, is prepared for sectioning with the high-speed ultramicrotome in such a way that the boundaries of individual filaments can be identified when viewed in the electron microscope. The yarn is mounted in a special holder in which the filaments are spread out radially. They are then coated with a thin film of evaporated gold in the vacuum unit and allowed to fall parallel to each other. They are embedded in a very thin layer of low-melting-point paraffin and sectioned with the ultramicrotome. The thin film of gold enables one to determine whether the area being studied is near the surface of the filament. 5 illustrations. E.S.

MILL MANAGEMENT

BALL, A. N. Relation between top management and engineering in the field of paper manufacturing. Pulp Paper Mag. Can. 50, no. 2: 70-2 (February, 1949).

Because of the differences in the main objectives of development and maintentance engineers, the later are more closely allied to actual production and the former to top management. With new mill construction falling off and the modernization and expansion of existing facilities and venturing into new fields receiving more emphasis, the mill development branch must carry the major load. In modernizing or revamping a mill, (1) the objective as to quantity and quality must be kept in mind, (2) the most effective and desirable layout must be planned, and (3) the best sequence of the various development steps determined. (1) is carried out chiefly by top management and sales executives who consult production and engineering mainly on questions regarding the feasibility of certain proposed changes. Production and engineering departments co-ordinate in arriving at satisfactory flow diagrams and the equipment necessary to achieve the desired results. (2) results from schematic plans and requires a thorough knowledge of the overall objectives for everyone working on it. Each alternative plan necessitates a complete survey of its requirements from inception to completion, calling for very close co-operation between production and engineering departments and top management. When the general plan is drawn up, it should be kept flexible and ideas for future necessary changes should be

included. (3) must be the result of careful study—for a change in one department usually affects several others—and requires the closest possible co-ordination with top management. Because the projects giving the most desirable return deserve first priority if possible, the sequence is definitely affected by estimated returns. Before any definite procedure can be worked out, the engineering department must know how much money it will be permitted each year, a point which requires close work between engineering and top management. Any deviation from the estimated time or cost of completion of any phase of the development must be reported to management as soon as it is apparent. A further function of the engineering staff is to supply partially trained personnel to the operating department. R.R.

PACKAGING PARADE. Packaging materials procurement control. Packaging Parade 17, no. 192: 42-3; no. 193: 42-3 (January, February, 1949).

Packaging materials control must extend from the time the new product or a change in an old one is contemplated to the point of inspection prior to shipment. In a business such as that of Johnson & Johnson, packaging materials are secondary in importance only to the basic materials comprising the finished products. Such products must conform to high standards and remain unchanged from production line to consumer. The high cost of the material also adds to the importance of packaging. The Johnson & Johnson organization is discussed as regards new product development, product acceptance, package specification development, sales planning, finished goods inventory control, manufacturing planning and control, purchasing and raw stores inventory control, and quality control; a diagram of the set-up is given. Broadly speaking, packaging materials control requires the co-ordination of paper control—including material and product specifications, purchasing, receiving reports, etc.—and physical control—involving receiving, specification testing, storage, etc.—each of which is discussed according to the policy of E. B. Squibb & Sons. Inventory control, the prime object of materials control, should involve looking ahead to determine what and how much is to be produced and when, in contrast to the common practice of looking over the previous year's purchases and ordering about the same quantities of the same items. The production plan should cover not less than 12 months, the first three of which should be reasonably fixed and the remaining tentatively planned, with production indicated by months or quarters. Factors to be considered in determining what quantity of material will yield the lowest unit cost include the initial purchase cost, comprising the cost of issuing purchase papers, receiving the material, specification testing, and the cost of carrying the inventory, including storage, insurance, materials handling, etc. Inventory stock should be released only as properly authorized after having first cleared inventory control records. A combination organization and flow chart is given which might serve as a foundation for the establishment of a package materials control system. A description is also given of the interdepartment participation in packaging procurement control at Merck & Co., Inc. An illustration is included of the container specification records of the package developing department of that company. R.R.

WELDON, R. L. Human relations—the vital problem. Pulp Paper Mag. Can. 50, no. 1: 70-1 (January, 1949).

The Industrial Relations Section of the Canadian Pulp and Paper Association has been established to provide a forum for the interchange of knowledge and the common study of the problems of industrial relations. The author discusses the difficulties and different casts of minds facing the

industrial relations division of a company from both management and labor angle. A personality which is not easily discouraged, patience, and persistence are essential for the job. E.S.

OAK

ANON. Utilization of oak for pulp. Southern Pulp Paper Manuf. 12, no. 2: 21-2 (Feb. 15, 1949).

Reference is made to a project carried out at the wood utilization laboratory of the Engineering and Industrial Experiment Station, University of Florida, Gainesville, Fla., for utilizing scrub oak for board and papermaking. Boards, made of scrub oak fiber and bonded with plastics, have been developed for replacing scarce veneer used by the box and crate industries; boards of the Masonite type also hold promise. However, it is believed that southern hardwoods, scrub oak included, can be pulped to produce bleachable pulps which can take the place of northern soda pulps. The economic possibilities of a southern fine paper industry based upon bleached pine kraft pulp and hardwood soda pulps in Florida are discussed. E.S.

OILS AND FATS

BOLLEY, DON S. Synthetic drying oils. Ind. Eng. Chem. 41, no. 2: 287-94 (February, 1949).

An extensive and critical literature review is given of drying oils prepared through chemical treatment of fatty oils. Pentaerythritol—which is easy to esterify—has proved the most useful of all the polyhydric alcohols in the preparation of synthetic oils. Brief reference is made to refined tall oil which may be esterified with the various polyhydric alcohols mentioned in this review. The most interesting product, the pentaerythritol ester, will dry in a reasonable time to a hard, tack-free film. Because of its high rosin content, only small portions should be used for exterior paints; however, it is suitable for interior paints. 46 references. E.S.

PASSINO, HERBERT J. The Solexol process. Ind. Eng. Chem. 41, no. 2: 280-7 (February, 1949).

A review of the techniques and principles involved in the new Kellogg Solexol process is given, which is primarily concerned with the countercurrent extraction of animal, vegetable, and marine oils and fats, using liquid propane as a solvent. Various schematic diagrams are presented depicting the application of the process to the refining and fractionating of various oils, including tall oils. Accompanying tables give various properties of the fractions obtained. 11 references. E.S.

PAPER—COATED

HUCKLE, F. The production of coated, gummed and foil-lined papers. Paper Market: 160-1, 163 (December, 1948); 22-3 (January, 1949); Paper Box Bag Maker 107, no. 1: 17-19; no. 2: 58-9 (January, February, 1949).

Paper was probably first coated by hand in the early part of the nineteenth century to hide the dirt incorporated in it. By the 1860's continuous coating machines were available. The product was used for special plate work and was chiefly associated with lithography. When halftone block printing was invented by Meisenbeck in 1888, the use of the paper increased rapidly. A general description of the coating process is given, including the air-brush method, which is capable of speeds up to 1000 ft./min. Before calendering, the

paper must be matured to insure even distribution of the moisture. The main uses of coated papers and boards are considered and art, chromo, enamel, and surface papers are briefly characterized. The manufacture and uses of gummed and metal foil-lined papers are discussed in the second part of the reference. R.R.

PAPER—SHEET FORMATION

TOLLENAAR, D. Structure of paper. Ingenieur (Utrecht) 60: MK 51-3 (1948); Brit. Abstracts B II: 471-2 (October, 1948). [In Dutch; abstract in English. Abstract only available]

The structure may be described by means of the two constants: average pore radius and pore *d*, these being calculated from two independent equations, e.g., those of Lucas and Washburn, and Poiseuille. A method of describing the structure by means of three constants is described. It assumes a size distribution of pore radii according to Gauss, and explains the phenomenon of continued spreading by the difference in capillary pressures in narrow and wide capillaries. E.S.

PAPER AND PULP INDUSTRY

ATCHISON, JOSEPH E. Marshall plan for paper: activities of ECA Pulp-Paper Branch. Pulp & Paper 23, no. 2: 66 (February, 1949).

The objective of the Pulp and Paper Branch of the Economic Co-operation Administration is to assist countries participating in the European Recovery Program in their efforts to produce or otherwise obtain adequate supplies of pulp and paper. The emphasis has been on raw materials, rather than finished paper products. A general summary is given of the work of this group. R.R.

FOWLER, R. M. Pulp and paper output $800 million in 1948. Pulp Paper Mag. Can. 50, no. 1: 61-5 (January, 1949).

The author reviews the highlights of the Canadian pulp and paper industry during the year 1948, including new production records both on a tonnage and dollar basis, betterment in inventories and woods labor, the forest situation, expansion programs, changes in the export markets, and data on the country's newsprint, fine paper, wrapping paper, and paperboard output. The value of the industry's output is now twice that of the value of Canada's wheat or automobile production, and substantially greater than all the mineral production of the country. In foreign trade, pulp and paper represent not only by far the largest export item, but produced also 40% of all the dollars stemming from commercial exports moving to the U. S. market. E.S.

HALL, GÖSTA A. Manufacturing trends in the Swedish pulp industry. Svensk Papperstidn. 51, no. 24: 579-88 (Dec. 31, 1948). [In French; Swedish summary]

After briefly emphasizing the importance of the Swedish forests to the entire economy of the country, the author explains why Sweden developed an extensive pulp industry and did not upgrade her own products further by converting them into paper. At the time when the Swedish chemical pulp industry was developed, all countries to which exports could be directed had a well-established paper industry and were anxiously guarding their interests. Hence, a new paper-producing country would have met with very stiff competition. The Swedes, therefore, concentrated on the development

of high-quality pulps, a trend which became particularly noticeable during the last war, when the capacity for bleached sulfate and sulfite for either paper or rayon manufacture was greatly increased. Reference is made also to the new Swedish Forest Products Research Laboratory in Stockholm and its experimental paper machine. In conclusion, the work of Steenberg and coworkers (*cf.* B.I.P.C. 18: 113-14, 246-7) is discussed briefly. E.S.

MARATHON CORPORATION, *Rothschild, Wis.* Consumption of paper and paperboard compared with population and national income. Fibre Containers 34, no. 1: 40-3 (January, 1949).

A diagram is given comparing paper and board consumption, population, and national income from 1899 through 1948—figures for 1948 are based on actual statistics for six months. A steady rise is shown for population, beginning with 75 million in 1899 up to 145 million in 1948. National income and consumption show the same trends, except after 1941, when the income rose even more sharply than before, from 104 billion in 1941 to 221 billion in 1948, with a slight drop between 1945 and 1946. In the period from 1941 to 1944, consumption fell from 307 pounds to 282 pounds per capita, rose to 342 pounds by 1947, and decreased slightly (341 pounds) in 1948; instead of following this last drop, total consumption rose from 24.6 to 26 million tons in 1947-1948. In 1948 total consumption reached almost 1225%, based on 100% for 1899; per capita consumption stood at about 600%, income 1450%, and population about 190%. R.R.

MEIDELL, ARNE. The chief problems of the pulp and paper industries and a survey of the research activities. Norsk Skogind. 2, no. 12: 339-44 (December, 1948). [In Norwegian]

In the opening address of the "Technical week" of 1948, the author discusses the problems facing the Norwegian pulp, paper, and board industries with regard to limitations of raw materials and not fully utilized existing capacity problems in the purchase of wood, world market, and export conditions. A review of Norwegian forest products research activities and financial conditions is presented, with particular reference to the Papirindustriens Forskningsinstitutt and plans for Det Norske Skogforsøkvesen. E.S.

MURDOCK, HAROLD R. The future of Japan's paper industry. Newsprint Service Bur. Bull. no. 371: 6-7 (Dec. 17, 1948).

Japan's pulp industry is consuming more wood than is being allocated and its drain exceeds annual timber growth by 116%, yet its paper production is only one third of that for 1941. An adequate pulpwood supply is the industry's most important problem, for which reforestation is the fundamental long-range solution. Although nearly 6,000,000 tons of printing paper, four times the present need, could be produced from by-product straws, the paper industry is reluctant to consider this source. A more general acceptance of the semichemical method of obtaining higher yields of pulp from wood would improve the situation materially and the wider adoption of coated papers would effect an approximate saving of 10% of the present total sulfite pulp production. The prospects for importing pulpwood are not encouraging, but the plan to import sulfite pulp and newsprint has better possibilities. The use of hardwoods for pulp should be investigated. R.R.

PARSONS, JOHN L. Some interesting facts about paper. J. Chem. Education 26, no. 2: 114-17 (February, 1949).

The purpose of the present article is to emphasize the essentiality of paper in the development of our present-day mass-production economy. With ref-

erence to Dawe's sketch "The gray terror" (*cf.* B.I.P.C. 10: 43), certain historical highlights are mentioned, as well as changes in the techniques of papermaking during the last 100 years and some interesting statistical figures. The versatile character of paper is stressed and recent developments in the field of functional or mechanical papers are described. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

ANON. The French school of papermaking. Ind. carta (Milan) 2, no. 10: 109-11 (October, 1948). [In Italian]

After outlining the history of the French school of papermaking at Grenoble, the organization, objectives, and curriculum of the present school are described. E.S.

BALLOU, S. V., and LAUER, B. E. The current status of vocational training in the paper industry. I. The quantitative analysis. Tappi 32, no. 2: 49-51 (February, 1949).

As a result of a questionnaire prepared and distributed by the Technical Association of the Pulp and Paper Industry, replies were received from 122 companies representing 153 plants and mills. Some type of vocational training programs are in operation in 107 of the total number of plants and mills or in the communities in which they are located. More than one half the 107 plants have educational courses both in the plant and the community. The 128 mills that gave employment figures employ a total of 92,401 workers, of which 5013 are currently receiving some sort of training. The figures indicate that the larger the plant or company, the greater is the probability that it will have an inplant educational program. They also reveal that the smallest plants induce a larger percentage of employees to take advantage of educational opportunities, where they are available, than do larger plants. E.S.

BALLOU, S. V., and LAUER, B. E. The current status of vocational training in the paper industry. II. The qualitative analysis. Tappi 32, no. 2: 51-7 (February, 1949).

A qualitative analysis of the replies obtained from a questionnaire on vocational training sent to some 200 pulp and paper mills has led to several general observations pertaining to the emphasis given to certain types of training. The improvement of regular workers appears to receive the most attention in training programs with somewhat less attention being given to breaking in new men and upgrading personnel. There appears to be a much wider availability of pre-employment training in the trades than in the craft of papermaking. In general there appears to be little standardization of program, effort, or objective in the industry. 10 references. E.S.

HUDSON, A. T. "Developing your own mechanics and other tradesmen." Pulp Paper Mag. Can. 50, no. 1: 72-5 (January, 1949).

The author describes the organized program for training young men for jobs in the skilled trades in the Kimberly-Clark Corp. Although actually a modernized apprenticeship program, it is not called by that name and the trainees are listed as "Junior Tradesmen." The program lasts for three years, during which time the trainee is paid a wage providing for a reasonable standard of living—on the average 75% of the rate of the job for which he is training. The details of the program and pitfalls to be avoided are described, with special emphasis on the proper selection of trainees in the very beginning. E.S.

PAPER AND PULP MILLS

ANON. Arkansas mill upping output 40%; big Crossett program. Pulp & Paper 23, no. 2: 56, 58 (February, 1949).

The Crossett expansion program, to be completed early in 1950, will increase the company's paper production by 40%; the pulp mill capacity is being enlarged from 300 to 375 tons. The addition of three digesters, a 100,000-lb./hr. power boiler, a 6000-kilowatt turbo-generator, additional wood-room equipment, a water-treating plant, and a personnel facilities building is already accomplished. Still in the process of completion are a new Beloit high-speed Fourdrinier machine, additional equipment in the evaporator, washing, and refining departments of the pulp mill, a Combustion Engineering recovery unit, and changes in most mill departments. Wherever practical, the mill is being painted according to color dynamics for safety and improved working conditions. Descriptions are given of the new paper machine, auxiliary equipment, and the Permutit water-treating plant which reduces the hardness of all boiler makeup feed water from about 85 to 2-4 p.p.m. Three new eight-ton stainless steel-lined digesters, a five-stage evaporator set, and a rotary pulp-washing set are included in the program. R.R.

ANON. The China Paper Mills, Inc. Newsprint Service Bur. Bull. no. 373: 2-3 (February, 1949).

An illustrated description is given of the present installations of the China Paper Mills, Inc., at Ipin on the Yangtse River, including one Waterous Great Northern grinder, one centrifugal pulp screen, thickeners, and storage tanks, and one small newsprint machine with a daily capacity of about 10,000 pounds. It is planned to transfer chemical pulp and paper equipment from the mills at Yinchow and Chinchow, thereby increasing the production to 50 tons per day. A new machine is being built in Shanghai. E.S.

ANON. LongLac mill operating, production streamlined. Paper Mill News 72, no. 8: 9-10, 12-14, 16, 20 (Feb. 19, 1949).

The new 300-ton bleached sulfate mill of the LongLac Pulp & Paper Co., Ltd., subsidiary of the Kimberly-Clark Corp., at Terrace Bay on the north shore of Lake Superior, Ont., Canada, is now in operation. An illustrated description of the equipment of the mill is given, which was laid out for streamlined, straight-line production. The bleaching system consists of five continuous stages (one chlorination, two caustic, and two hypochlorite stages), each with reaction towers, dump chests, and vacuum washers. The bleached pulp is pumped through two Kamyr wet sections to two Fläkt driers before going to the hydraulic baling press and from there to freight cars or storage. Several flowsheets are included. E.S.

ANON. Machine migration: Champion moves four South. Pulp & Paper 23, no. 2: 37, 39-41, 86 (February, 1949).

The Champion Paper and Fibre Co. will move four papermaking machines to its mill at Pasadena, Texas, by 1951. One of these machines was in operation in Texas in November, 1947. The present capacity of the mill is 450 tons of pulp and 230 tons of paper. The machine already moved produces milk-bottle stock; those still to be moved will produce magazine, offset, bond, coffee bag, and uncoated groundwood book papers. An illustrated description is given of the Pasadena mill, including the new groundwood mill and the pulp preparation, bleaching, recovery, and power equipment. For use with the machine already moved there are four Majestic jordans driven by General Electric motors and one Dilts Hydrapulper. A 20-foot-diameter

batch Shartle Hydrapulper will serve all the moved machines. Five tanks and four filters were added to the bleach plant. The enlargement of the water-treating plant has provided a new cooling tower with a daily capacity of 20 million gallons. The mill uses 20-30 million gallons of water daily and has asked for an additional 10 million gallons daily from municipal sources for the machines to come. Four Combustion Engineering recovery boilers have been converted or overhauled and a new Babcock & Wilcox recovery boiler equipped with a new Cottrell precipitator and five other Babcock & Wilcox boilers have been installed. A new General Electric turbo-generator has doubled the electrical energy production; a third turbine will be installed later. Shipments can be made by barge or rail from the mill to Hamilton, Ohio, and Chicago. R.R.

ANON. Mexico's newest paper mill. Pulp & Paper 23, no. 2: 36 (February, 1949).

Mention is made of the new paper mill of Papelera Nacional, S.A., located at Tlalnepantla near Mexico City, Mexico. Two 14-ton rebuilt machines are to be used for the production of white paper and/or cigarette paper. Don Jose de la Macorro II is head of the mill, as well as of the new Cartonera Nacional, S.A., mill also at Tlalnepantla. The latter has a 300-foot-long board machine. R.R.

ANON. One of the world's most diversified paper producing groups. Paper Box Bag Maker 107, no. 1: 8-10 (January, 1949).

A history is given of the development of the International Paper Co. from the consolidation 50 years ago of 18 pulp and paper companies in northeastern United States to the present time. R.R.

STEPHENSON, J. NEWELL. A long jump between mills. Pulp Paper Mag. Can. 50, no. 1: 66-9 (January, 1949); *cf.* B.I.P.C. 19: 413.

After a brief reference to the new mill site at Port Edward, 12 miles north of Prince Rupert, where building operations will start in the spring of 1949, the modernization programs of the two newsprint mills at Pine Falls of the Manitoba Paper Co. and at Kenora of the Ontario and Minnesota Pulp and Paper Co. are described, supplemented by illustrations. The capacity of the Pine Falls mill will be raised from 300 to 400 tons per day; the Kenora mill is now producing 350 tons of newsprint daily. E.S.

PAPER SIZING

HERCULES POWDER COMPANY. Automatic rosin emulsifier at Finch, Pruyn and new Tacoma mill. Pulp & Paper 23, no. 2: 53-4 (February, 1949); *cf.* B.I.P.C. 19: 414.

The new process of automatically emulsifying rosin size was developed to enable paper mills to reduce labor costs and space requirements and to provide a very uniformly concentrated, high-quality size emulsion. The first far western installation is in the new Tacoma, Wash., mill of the St. Regis Paper Co.; an earlier installation is that in the mill of Finch, Pruyn & Co., Glens Falls, N.Y. An illustrated description is given of the process, with particular emphasis on the Tacoma installation. R.R.

PAPER SPECIALTIES

ANON. Butter now being packaged in patty form. Packaging Parade 17, no. 193: 64 (February, 1949).

Butter is now available in the form of 60 patties per pound, wrapped in an aluminum-foil laminate. Two wrapped layers of patties with a fiberboard stiffener between are enclosed in an outer wrapper which folds around the packs and permits the foil to show at the ends of the package. Extensive tests have shown the new wrap to be an effective means of maintaining the butter score until it is consumed. R.R.

ANON. Glassine rounds out your doily line. Paper Sales 9, no. 2: 12-13, 34, 36 (February, 1949).

To satisfy the needs of bakeries and restaurants for a decorative dainty doily that will not absorb grease, mills and converters have produced glassine doilies, which may be cut and embossed to resemble their fabric counterparts. Glassine doilies have an advantage over some die cut from sulfite stock in that they separate more easily. They are made chiefly of 25-pound glassine which is imprinted if desired and embossed while in jumbo rolls, and then die cut. The glassine is thoroughly calendered and can be given brilliant gleaming colors by adding dye to the furnish. The pulp stock is usually 100% long-fiber spruce, well beaten and perhaps jordaned. R.R.

ANON. New merchandiser for margarine. Packaging Parade 17, no. 193: 40-1, 86 (February, 1949).

A new margarine package, designed especially for the colored product, consists of a heat-sealed laminated Mullinix package with a zip-tape opener in the center. The end seals are made tamperproof by automatically applied adhesive and heat sealing. The advantages of the new package include the following: the initial package cost is half that of the conventional tuck-end carton, no overwrap is necessary, the weight of the package is halved, less space is required for the shipment and storage of the packaging materials and of the packaged product, and less air is included in the closely conforming wrap so that the contents keep cold longer after their removal from a refrigerator. R.R.

GIANNI, ENRICO. Abrasive papers. Ind. carta (Milan) 2, no. 10: 107-9 (October, 1948). [In Italian]

The author describes the base paper, abrasive substances, and glue used in the manufacture of abrasive papers. The early processes were of the batch type and involved the treatment of individual sheets; modern methods use a continuous procedure in which the abrasive is applied to the traveling paper web. An outline of the continuous process is given. E.S.

KAESS, G. Aluminum foils for packaging. Food 17, no. 206: 331 (November, 1948); Packaging Abstracts (PATRA) 6, no. 1: 6 (January, 1949). [Abstract only available]

At the German Institute of Food Technology, detailed investigations of the use of aluminum foils have shown that faulty manufacture may result in the presence in these foils of pores, which can have unfavorable effects upon the durability of the foodstuffs packaged in them. In particular, thin foils very often show a highly porous structure. Extensive tests have proved that there exists a statistical relationship between gage of foil, average number of pores, and permeability to steam at 20° C. The following results have been found in tests with polished foils: gage (in μ) 8, permeability to steam 4, number of pores/sq. dm. 17; gage 10, permeability 26, pores 89; gage 12, permeability 55, pores 185. Different results have been obtained for varnished and covered foils, their permeablity to steam being low, even though the number of pores may be high. Consequently, thin foils and foils of high

porosity provided with suitable varnishes and coverings may advantageously be used for the packaging of hygroscopic goods. As regards fields of application of aluminum foils for hygroscopic and moist foodstuffs, the following suggestions are made: (1) For highly hygroscopic goods or for goods exposed over a long period to high air humidity (particularly in association with high temperatures), foils of 12-15 μ gage or varnished covered foils of 10 μ gage are used. Permeability to steam can be almost entirely eliminated by joining the aluminum foils to Luvitherm or cellulose acetate foils with a waterproof glue. A still better method is to use aluminum foils between Luvitherm and cellulose acetate foils. Great care must be taken in packaging to see that there is no damage to corners, edges, or sides. (2) Polished foils not less than 10 μ in gage can be used for packaging purposes in a continental climate (20° C. and 65% R.H.) or under humid or dry tropical conditions, if the goods are to be stored for a brief period only. Varnished and covered foils may even show 30-130 pores/sq. dm. Bouillon cubes, powdered whole milk, and infants' foods are particularly suited to this method of packaging. (3) Polished aluminum foils of 8 μ gage can be used for goods of a less hygroscopic character in the climatic conditions of continental Europe. Varnished and covered aluminum foils with up to 690 pores/sq. dm. may also be used for dried fruits, jam, confectionery, pastry, skimmed milk, cheese powder, egg powder, frozen foods, and bouillon cubes. E.S.

KLENKE, JOHN J. When you sell to meat packers. Paper Sales 9, no. 2: 14-15 (February, 1949).

The meat-packing industry, with its numerous special packaging problems, needs special papers, the sale of which enables the salesman to show many related lines which can be useful to the prospective purchaser. The salesman should be familiar with paper manufacturers' specifications and the problems peculiar to meat packers. A list is given of paper products needed by that industry which includes office supplies as well as items for packaging. R.R.

PEDERSON, P. O. Characteristics of industrial inhibitive wrappings. Am. Paper Converter 23, no. 1: 18, 26 (January, 1949).

Because moisture absorption by the wrapper is the most frequent cause of corrosion of ferrous metals, protection against corrosion is the most important function of such a wrap. The paper should be neutral so that it contains no corrosives and should have actual corrosive-inhibiting characteristics. Rapinwax greaseproof papers are treated with an inhibitor which functions wherever the paper touches the metal. The inhibitor does not volatilize, but is activated by the presence of a small amount of moisture. The greaseproofness should be adequate to retain the preservative oil on the critical surfaces or should prevent leakage of the enclosed fluid that might stain the package or contaminate others. Although the TAPPI turpentine test is a good laboratory tool, the only positive way of determining greaseproof protection is by actual commercial tests. The wrap must be handled easily, and should conform to the surfaces of the product to be protected, be tough enough to stand ordinary wear, and stable under aging and use. The wrap should not interfere with the operation of the preservative or react with it to produce adverse effects. R.R.

TERVEN, LEWIS A., COMPANY, *Salinas, Calif.* West Coast carrot operation. Modern Packaging 22, no. 6: 114-19, 178 (February, 1949).

Among the special features of the Terven operation are the use of a chemical additive for ice to preserve it, keep it colder, and create a mold-

inhibiting atmosphere; the use of a sprayed wax protective coating for topped carrots; and an automatic wirebound box-closing machine. Bunch carrots are tied by pickers in the fields with a wet-strength printed paper tie and washed and cooled with water and a special refrigerant, Tw-Ice, which is also used for topping, bunker, and blown ice in shipping. High wet-strength rippled parchmentized paper is used for crate liners. Lithographed labels with a special adhesive backing are applied to each end of the crate. Other carrots are topped in the field and sent in burlap bags to the packing shed. Here they are cleaned, sprayed with wax, automatically graded, culled, and crated or bagged. Consumer-size bags of 450-LSAT Cellophane or Pliofilm are used for prepackaging. One great need is a shipping container lighter, cheaper, and more easily handled than those now used. R.R.

U. S. DEPARTMENT OF COMMERCE. Moisture vapor barriers. Packaging Parade 17, no. 193: 54-6 (February, 1949).

An excerpt is given from a Department of Commerce report dealing in part with the heat sealing of moisture-vapor barriers. A general description is given of vapor-barrier packaging materials consisting of laminations of cloth or scrim, kraft paper, and metal foil, the latter being coated with a thermoplastic. To take care of any vapor which might penetrate by way of pinholes in the foil, a moisture absorbent should be placed within the package. Such materials have been used chiefly in carton-barrier-carton and floating-bag applications. The former consists of a carton into which is placed the article to be protected with proper cushioning and the absorbent. The tape-sealed carton is inserted into a bag made of moisture-vapor barrier material, and this unit is placed into another carton. The floating bag is generally used for large units and consists of a large "blanket" made by heat-sealing several strips of a moisture-vapor barrier. The blanket is draped around the object and heat sealed. The importance of careful heat sealing and the need for further study of such protective packaging are emphasized. R.R.

WAGGONER, MILLS. Sell gummed tape for all it's worth. Paper Sales 8, no. 12: 19-20, 42-5 (December, 1948); 9, no. 1: 20; no. 2: 19-20, 39-41 (January, February, 1949); *cf.* B.I.P.C. 19: 181.

By passing on to his customers useful performance-improving and time-saving suggestions, such as are given in this series of articles based on the author's "The gummed tape user's handbook," the paper salesman can hold his business. In the first of the series, the author discusses proper moistening, the first step in using gummed tape. Consideration is given to the three kinds of tape dispensers and their use: the pull-and-tear type with no mechanical control over water level or brush pressure; machines with automatic water-level control and a nonadjustable pressure system; and those which have both automatic water-level control and adjustable pressure control. The second part of the series is concerned with the application of moistened tape. Illustrations are given to show the correct way of sealing a telescoping box and a parcel-post package. Some successful paper salesmen make the repair of tape dispensers part of their business; in addition, they secure repeat sales of tape resulting from the customer's appreciation of the salesman's knowledge. With this in mind, the author devotes the last part of the series to the use and maintenance of tape machines. It is well for the operator to put aside an occasional gummed tape-sealed carton to be examined after the glue has dried. The salesman will find it a good idea to deliver a machine of a style with which the customer is unfamiliar and to make sure that he knows how to use it before it is put into actual operation. R.R.

PATENTS

WEST, CLARENCE J. United States patents on papermaking; third quarter, 1948. Tappi 32, no. 2: 37-8, 40, 42 (February, 1949); *cf.* B.I.P.C. 19: 34.

A list of U. S. patents on papermaking for the third quarter of 1948 is presented. E.S.

PHOTOSYNTHESIS

APPLEBY, DOROTHY K. The action of light on textile materials; a review of the literature. Am. Dyestuff Reptr. 38, no. 4: 149-56, 189-92 (Feb. 21, 1949).

The findings recorded in literature since 1920 on the action of light on textile materials are reviewed under the headings: radiation; the role of oxygen; other exposure conditions; physical properties of samples; evidence of actinism on natural fibers (cotton, bast fibers, wool, and silk), semi-synthetics (cellulose acetate and nitrate, viscose, casein and vegetable protein, and glass), and synthetics (acrylonitrile, polyamide, polyester, and polyvinyl); and comparative ratings. 232 references. E.S.

PHYSICAL TESTING—PAPER—GLOSS

SMITH, DANIEL, and MAHONEY, MARIE M. Preparation and application of reproducible gloss standards. J. Optical Soc. Am. 39, no. 1: 86-90 (January, 1949); *cf.* B.I.P.C. 19: 340.

Essentially the same description of the polystyrene replica technique is given as in the previous reference. E.S.

PHYSICAL TESTING—PAPER—MACHINE DIRECTION

ANON. Simple paper tests. I. How to determine the machine direction of paper. Paper & Twine J. 22, no. 1: 14 (January, 1949).

Four simple, fairly accurate methods are described for testing the machine direction of paper. Circular test specimens may be floated on water; the axis of the curl will be parallel to the machine direction of the paper. Two specimens cut at right angles to each other can be held horizontally by their ends, placing each in turn on top; the specimen cut into the cross direction will bend more and fall away from the other. In a bursting strength test, the chief rupture lines will be at right angles to the machine direction of the paper. Of two specimens cut at right angles to each other and tested for tensile strength, the specimen the length of which corresponds to the machine direction will have the greater tensile strength. R.R.

PHYSICAL TESTING—PAPER—SIZE RESISTANCE

HARRISON, V. G. W., BANKS, W. H., and POULTER, S. R. C. An examination of electrical methods of measuring sizing degree of papers. Proc. Tech. Sect. Paper Makers' Assoc. Gt. Brit. & Ireland 28, no. 1: 337-61 (June, 1947).

Electrical methods of measuring the sizing degree of papers are briefly reviewed, and the Currier and K.B.B. sizing testers are examined in detail. The main weaknesses of the Currier instrument are: extreme sensitiveness to the effect of pinholes and weak places in the sheet; unsatisfactory design of the wetting pad; arbitrary nature of the endpoint; and dependence of the results on the effect of water vapor rather than liquid water. The draw-

backs of the galvanic K.B.B. sizing tester are: the ranking of papers is seriously dependent on the choice of the endpoint; the potential developed by the galvanic cell is variable with time and erratic in behavior; and the results depend more upon the effect of water vapor than upon the penetration of liquid water. Both instruments are based upon the misconcept that paper acts as an insulator until liquid water penetrates the test sheet and makes contact with the electrodes, and the outstanding difficulty with both is to establish the meaning of the figures in terms of water penetration times. Neither instrument is considered suitable for precision work. 24 references. E.S.

WILSON, W. S. Determination of sizing by the wet break test. Paper Trade J. 128, no. 5: 13-17 (Feb. 3, 1949); *cf.* B.I.P.C. 18: 697.

A description is given of the wet break test which measures sizing efficiency. One and a half centimeter strips, having various weights attached to one end, are suspended in water until the strip breaks. A curve of time to break is then plotted against the weights used; there is nothing uncertain about the endpoint. The test is claimed to be infinitely more useful than the water penetration test, some shortcomings of which are mentioned; it also possesses certain advantages over other types of tests. 10 diagrams. E.S.

PHYSICAL TESTING—PULP—BEATER PROCESSING

LARSEN, FRODE, EKSTAM, TORSTEN, HUMBLE, I., and STEPHANSEN, E. Beating of cellulose. Norsk Skogind. 2, no. 12: 346-50 (December, 1948). [In Norwegian and Swedish] *cf.* B.I.P.C. 19: 107-8.

The full text is presented of the critical discussions following the presentation of Stephansen's paper "Beating of cellulose" and the description of the P.F.I. mill, with a final reply by the original author. E.S.

PHYSICAL TESTING—WAX

KINSEL, ANTHONY, and SCHINDLER, HANS. Adhesion test for microcrystalline wax. Paper Trade J. 128, no. 5: 18-20 (Feb. 3, 1949).

A test is described for determining the adhesive properties of microcrystalline waxes and their performance as lamintaing agents, including the apparatus, preparation of specimens, and testing procedure. The test instrument proper consists of a Suter tensile strength tester with suitable clamps for holding the specimens. The adhesion of the wax is determined by measuring the force required to separate two pieces of cellophane of exactly one square inch bonded surface, which are laminated to a third piece of cellophane coated on both sides with the wax to be tested. The reproducibility and accuracy of the test are discussed. 2 illustrations. E.S.

PIGMENTS

ESME, A. A colored pigment for papers: ocher. Papeterie 71, no. 1: 13-15 (January, 1949). [In French]

The various natural and red ochers are discussed very briefly and mention is also made of synthetic ochers. In France, the analytical range of the native pigment (after drying at 100° C.) is usually 20-38% ferric oxide, 52-70% aluminum silicate, and 4-10% water of constitution. L.E.W.

JACOBSEN, A. E. Significance of pigment particle size and shape. Can. Chem. Process Inds. 33, no. 2: 124-31 (February, 1949).

For many protective and decorative coatings, the optimum optical and physico-chemical properties of pigment-binder systems are interrelated with the size and often with the shape of the particulate component. The author gives examples to show the influence of coarse materials on dispersion or texture and the results of pigment flocculation in paint coatings. He defines particle size, considers its measurement and effect on the opacity, tinting strength, durability, and consistency of white pigments, and summarizes studies with colloidal carbons, colors, extenders, aluminum flake powder, and photoluminescent materials. 75 references, 7 figures, and 10 tables. R.R.

PITCH TROUBLES

GAVELIN, GUNNAR. The effect of mill water on pitch troubles in paper mills. Pulp Paper Mag. Can. 50, no. 2: 59-64 (February, 1949); *cf.* B.I.P.C. 18: 38-9.

Studies of the effect of the hardness of mill water on pitch trouble have been confusing and have failed to give a definite answer to the problem. To gain further information on the subject, the author carried out tests on 150 grams of pulp in 3 liters of water which was disintegrated in the disintegrator of the British pulp testing apparatus for 60 minutes at 40° C. The pitch adhering to the container walls was dissolved in dichloromethane, distilled, and weighed. The mill water used was found to be much more harmful than distilled water. This was not the result of solid particles in the water or dissolved organic mater. Very hard artesian water could be less harmful than mill water to the extent that it could be compared with distilled water. Sea water gave results similar to mill water. The trouble was not helped by flocculation with alum, permutite softening, or sand filtering; calcium, sodium, or chlorine ions had no appreciable detrimental effect. Although laboratory conditions and those in the mill where the work was carried out seem definitely correlated, it is possible that other mills might get different results. After it was suspected that the bicarbonate ion might be causing the trouble, the water was acidified and then aerated or boiled to remove the carbon dioxide. The resulting water was almost as harmless in respect to detrimental pitch as distilled water. Descriptions are given and data are tabulated of further tests which confirm these results. Studies show that sulfite and groundwood pitch react fundamentally alike. Much less alum would be needed with white water if it were decarbonated. The use of ion exchangers for decarbonating water in industry seems promising. No reason is given for the great effect of carbon dioxide on pitch. Acidification of the water should be automatically controlled to a fixed acidity in much the same way as alum is now fed to the white water. The aeration of the acidified water is very important; care should be taken to leave a minimum amount of oxygen in the water after the process, because of its corrosive action. The removal of carbon dioxide by precipitation with lime is possible, but the large size of the plant necessary and the great quantity of acid essential for neutralization would probably make the process uneconomical. 14 tables. R.R.

PLASTIC FILMS (NONCELLULOSIC)

SIGNER, RALPH, and TAUBER, F. WARREN. Food uses for vinylnitrile. Modern Packaging 22, no. 6: 125-7, 180, 182 (February, 1949); *cf.* B.I.P.C. 19: 341-2.

The strength (values of 3000 to 4000 p.s.i. for 0.00175-gage film), stretch

(at least 250%), resistance to sudden and sharp impact, transparency, ease of heat sealing, and water-vapor permeability of the vinyl nitrile tubular film called Visten have made it of interest in packaging. Meat loaves so wrapped have been kept at 45° F. for as long as six weeks with virtually no weight loss and without mold growth. The oleomargarine package of this material has proven very popular. The quality of dill and sour pickles packaged in the film and stored at room temperatures for six to eight weeks was unimpaired. Cheddar cheese wrapped and cured in Visten for more than eight months at 45° F. showed no surface drying or mold contamination and was rated as equal to or better than wax-coated cheddar made from the same vat and stored under identical conditions. Studies are being made of the possibilities of the film for unit packages of cold meats for self-service operations. R.R.

PLASTICS

CHEMICAL ENGINEERING. Plastics. Chem. Eng. 56, no. 2: 125 (February, 1949); *cf.* B.I.P.C. 18: 458.

The total production of plastics set a new record in 1948, but only one major plastic, polyethylene, still enjoys a seller's market. All others fell into the buyer's market, because new plants increased the output to the point where it was well above the demand. In summarizing it can be said that 1948 was the beginning of the postwar shakedown for the plastics industry, with the emphasis on quality. Nevertheless, 1949 should show another record for total production poundage. E.S.

PLASTICS—TESTING

MARIN, JOSEPH, and HARDENBERGH, D. E. Creep of laminates in tension, bending, and torsion. Modern Plastics 26, no. 6: 101-6, 160, 162, 164 (February, 1949).

Paper-base (I) and cotton-base (II) laminates were tested for stress-strain relations in tension, compression, bending, and torsion and, where possible, the yield strength, ultimate strength, modulus of elasticity, and ductility were determined. The results were analyzed to determine the possibility of predicting theoretically the torsion and bending creep data on the basis of the tension creep results. Although (I) have a much higher tensile and flexual strength than (II), (II) have a higher compressive and torsional strength. Comparisons of yield strengths, stiffness, and ductility values for the two materials show similar differences. Thus, it may be seen that the mechanical properties of a plastic and, therefore, its suitability for a given application cannot be determined by a tension test alone. When unit creep strains versus time were plotted for the tests made, the creep-time relation was approximately represented by a straight line after the initial time period. The tests and manufacture of the materials tested are described, interpretations are given of creep results, and bending creep rates and torsion creep rates are compared. Data are given in nine tables and 20 diagrams, the latter also including illustrations of the equipment used. R.R.

POISONS

BRADFORD, ENID A. M. Some aspects of product contamination. Brit. Packer 11, no. 1: 17-19, 36 (January, 1949).

The author discusses product contamination for which the producer is directly responsible, including that arising from the raw material and metal containers; protection against such containers by vegetable parchment liners and coatings; contamination traceable to errors in processing foods; faults

developed during storage because of insufficient control of material packed in metal cans; and contamination arising from faulty containers, including cans and foil wraps. R.R.

POWER

BOBE, S. A. Power problems in a modern kraft mill. Paper Ind. 30, no. 10: 1471-6 (January, 1949).

The steam and electric power equipment of the new kraft mill of the Alabama Pulp and Paper Co. at Pensacola, Fla., is described in detail. The steam-generating capacity consists of one gas-fired and two recovery boilers. A separate bark and wood-refuse boiler provides almost the total 150 p.s.i. steam requirements for cooking. With the present arrangement it is possible to produce paper with a steam consumption of approximately 22,000 lb./ton. Electric power is generated by two duplicate turbo-generator units operating at 2300 volts; this voltage was chosen because it provided the opportunity to have interchangeable equipment with the adjacent Florida Pulp and Paper Mill. The paper machine drive is the latest Westinghouse design sectional drive with full electronic section speed regulators. The speed range is from 333 to 2000 ft./min. 13 figures, including a steam flow diagram and a schematic outline of the electrical distribution system. E.S.

PRINTING AND PRINTER'S INK

ANON. Feeding curled window envelopes. To get register with curled envelopes. Printing Equip. Engr. 77, no. 5: 47, 54 (February, 1949).

Two methods are given for overcoming the difficulty of proper register when printing curled envelopes. In one method, gummed paper is glued on the sucker foot catching the envelope window edge and in the other the register fork from a Craftsman automatic is used with gage pins and grippers. Illustrations are included. R.R.

ANON. The problem of sticking. Brit. Printer 61, no. 364: 51-2 (January-February, 1949).

Sticking may occur before printing because of excess moisture during paper storage or after printing because the film of ink fastens to the sheet above. Postprinting sticking usually occurs with nonabsorbent paper, such as metallic gummed paper. Paper which has such a tendency should be stacked in small piles or laid out separately in sheets after printing; cards are often kept from sticking by being stacked on end. The use of the correct ink and a spray will help. Suggestions are given for multicolor work, which is apt to prove troublesome in this respect. R.R.

KANTROWITZ, M. S. Research progress in the GPO. Printing Equip. Engr. 77, no. 5: 46-7 (February, 1949).

A report is given of research in the Government Printing Office on paper testing, inks, bookbinding, type metals, platemaking, press rollers, and duplicating processes. R.R.

WALLACE, PHILIP L. Aniline printing process. Printing Equip. Engr. 77, no. 4: 29-31; no. 5: 33-5 (January, February, 1949).

The aniline process prints a film of fluid ink by means of a rotary press, web-to-web, using rubber plates and/or rubber design rolls. It is simple and economical. With the rapid developments made since the war, it is now ac-

cepted for printing transparent films for food packaging, folding boxes, decorated papers, parchment and container-board drinking cups, milk containers, and ice cream cartons, and in the textile industry. The author gives a general outline of the process to further a better understanding of its technique, considering the presses and their operation, the standard doctor-roll system and the Anilox method of ink distribution, paper and inks, rubber plates, coating and lacquering, drying, thermostatic operation of blower and heating units, air recirculation, auxiliary equipment, and new applications and developments. Four diagrams show the single-unit impression method and the opposed printing method of rotary aniline printing and the standard method and the Anilox method of ink distribution. R.R.

PRINTING AND PRINTER'S INK—BRAILLE

THE NATIONAL INSTITUTE FOR THE BLIND. *Printing and Publishing Department, London.* Braille printing. Brit. Printer 61, no. 364: 41-3 (January-February, 1949).

A description is given of Braille printing and the method by which it is done and the printed pages converted into a finished product. The paper used for publications of more or less current interest can be relatively cheap stock, but for more permanent material a tough paper is needed that will withstand the repeated touch of many users and retain unbroken dot shape under the pressure of the covers and accompanying leaves of the book. R.R.

PRINTING AND PRINTER'S INK—IDENTIFICATION

INTERCHEMICAL CORPORATION. *Research Laboratories, Microscopy Group.* Photomicrography of printing. Interchem. Rev. 7, no. 3: 88-9 (Autumn, 1948).

Illustrations and brief explanations are given of ten specimens of letterpress, gravure, and lithography magnified six times, illustrating characteristic differences in detail. E.S.

RAYON—STATISTICS

CHEMICAL ENGINEERING. Rayon. Chem. Eng. 56, no. 2: 122 (February, 1949); *cf.* B.I.P.C. 18: 462.

Rayon production and consumption exceeded a billion pounds in the United States for the first time in 1948. The estimated figures (many taken from *Rayon O'rganon*) are about 16% higher than those for 1947; they include 561 million pounds of viscose and cupra filament yarns, 290 million pounds of acetate filament yarns, 184 million pounds of viscose staple fiber, 85 million pounds of acetate staple fiber, and about 70 million pounds of the true synthetic fibers, such as nylon, Vinyon, and saran. Almost 250 million pounds of the viscose production are consumed by tire yarns; viscose textile yarns have almost been overtaken in volume by the acetate. Among the most important developments of the year were the decisions to erect three new dissolving pulp mills, two by rayon manufacturers and one by a large pulp and paper producer; these are expected to be in operation in 1950 and to increase present U. S. and Canadian capacity by 35%. E.S.

RAYON—VISCOSE PROCESS

HAAS, HEINZ. Comparison of the swelling and solution mechanism of beech and spruce pulps in the manufacture of viscose. Das Papier 2, no. 21/22: 397-401 (November, 1948). [In German]

By following the swelling and solution of the two pulps by means of the microscope, the author arrives at certain conclusions regarding the poorer filterability of beech pulp-viscose solutions. Apart from the difference caused by fiber dimensions, the swelling phenomena were qualitatively similar in the two types of fibers. However, photomicrographs taken at specific time intervals after carbon disulfide addition show that, at the start of the xanthation, beech pulp reacts far less uniformly and less rapidly than does spruce pulp. This probably is the reason why greater filtration difficulties are experienced with viscose solutions prepared from the former than from the latter. Inasmuch as the carbon disulfide actually used in a commercial operation is always far less than that which can be taken up by the cellulose molecule, any unevenness in viscose formation means that swollen fibers take up an excess of carbon disulfide at the expense of unswollen fibers. This is substantiated by the fact that the sulfur: cellulose ratio of fiber residues (so-called "jellyfish disks") in the viscose reaction is lower than that found in the soluble portion of the viscose. Hence, filtration is hindered by these residues. 14 references and 12 microphotographs. L.E.W.

RESEARCH

ULMANN, M. Research in wood chemistry in the U. S. S. R., a progress report. Holzforschung 3, no. 1: 25-31 (1948); *cf.* Nikitin, N. I. J. Applied Chem. (U. S. S. R.) 20: 1083-96 (1947). [In German]

Extracts are given of the Russian author's reports on the researches of the following agencies: Central Scientific Research Institute of Wood Chemistry, All Union Research Institute on Wood Hydrolysis, The Leningrad Academy of Wood Technology, the Ural Wood Technological Institute, and of numerous advanced institutions dealing with forestry and wood technology. The subjects covered briefly are: synthetic camphor from turpentine, chemistry of turpentines and rosin, wood distillation, and the hydrolysis of wood and of agricultural waste products. Investigations on pulping will be covered in a separate publication. 64 references. L.E.W.

RESEARCH LABORATORIES

CHASE, GEORGE F. Packaging lab—how and why. Modern Packaging 22, no. 6: 88-91 (February, 1949).

The Western Waxed Paper Co., a division of the Crown Zellerbach Corp., has recently initiated work in a new packaging laboratory for the purpose of studying flexible packaging materials and methods. The laboratory collaborates with the company's converting plants in developing manufacturing specifications, investigating materials made and sent by the company and also by other organizations, and studying new items proposed for manufacture by converters. Recognized testing apparatus is used in climatic rooms reproducing various conditions. Pilot-scale equipment duplicates manufacturing operations. An illustrated description is given of the laboratory. R.R.

COLLEY, F. T. Research expansion, a quick survey of PATRA. Brit. Printer 61, no. 364: 21-6, 48 (January-February, 1949); *cf.* B.I.P.C. 19: 347.

A history is given of PATRA, beginning with its inception in 1930 as The Printing Industry Research Association and including its growth, economic background, a summary of membership qualifications, obligations, and benefits, its research program, and a description of the buildings it has occupied. Illustrations of the new research building supplement the text. R.R.

RESIN, SYNTHETIC

DUDLEY, JAMES R. Urea and melamine resins press toward new goals. Chem. Inds. 64, no. 2: 224-30, 320 (February, 1949).

Urea and melamine resins belong to the thermosetting type; urea resins have been commercial products since the 1920's, whereas melamine resins were introduced only 10 years ago. Together they constitute a 100,000,000 pounds-per-year business, of which the melamines constitute only 15%. Their applications are reviewed, including molding compounds; laminating resins; adhesives; paper, leather, and textile treatments; surface coatings; and ion exchange resins. 78 references. E.S.

LABORATORIO DELLA FIBRA VULCANIZZATA. Synthetic resins in the paper industry. Ind. carta (Milan) 2, no. 10: 105-6 (October, 1948). [In Italian]

Reference is made to the use of synthetic resins in the paper industry in the United States, Sweden, and Italy, including economic considerations. Beater and machine applications are discussed, as well as the advantages and drawbacks of each method. E.S.

SAFETY

CANTIN, J. E. Accident prevention. Pulp Paper Mag. Can. 50, no. 2: 48-53 (February, 1949).

In a general discussion of accident prevention, the author enumerates and discusses the prerequisites for starting a well-organized safety program: management leadership, co-operation of superintendents, a safety director, an analysis of accident records, a general meeting of operating executives, inspection of operations, development of mechanical safeguarding, provision of first-aid facilities, a general announcement of the accident prevention plan, and consideration of engineering revisions, cost, and the adaptability of the plan to the particular problems of the organization. He emphasizes the fact that success in such a plan can be achieved only by striving for 100% efficiency, even though it is beyond human reach. R.R.

WHITE, JAMES S. Safety is your business. Paper Ind. 30, no. 10: 1476-9 (January, 1949).

By representative examples the author shows how a variety of obstacles ordinarily encountered by any safety director or department may be overcome and safety consciousness be promoted to the extent that safety is considered part of everybody's job at all times. E.S.

SCIENCE

PRIOR, PHILIP H. The nature and practice of science. Proc. Tech. Sect. Paper Makers' Assoc. Gt. Brit. & Ireland 28, no. 1: 157-66 (June, 1947).

Science is defined by the author "as a body of knowledge collected by observation arranged in a systematic manner leading to the discovery of general truths as to the nature and behavior of natural phenomena." Science itself justifies study as to what it does, how it operates, and what may and may not be expected of it. The present article is essentially a review—admittedly incomplete and sometimes disjointed—of this wide subject. The mere collection of data is not sufficient; in the collection of knowledge, the scientist employs the scientific method, which consists of the stages of observation, hypothesis (trial theory), deduction or prediction, and

verification (by experiment). Science is at its best with simple inanimate situations and it is for this reason that chemistry and physics have made so much progress, and biology, psychology, and sociology have often been a failure. The scientist trained at college in the science of the more simple subjects tends to be baffled when meeting the more complex problems involving human beings. The author discusses the difficulties caused by human behavior—first, by the human characteristics of the scientist himself and, second, when knowledge has to be transferred to others. The difference between the inventive and scientific mind is pointed out, as well as the "strategy" needed by the scientifically trained man in dealing with practical problems. In conclusion, reference is made to some techniques of value to the young scientist entering the paper industry, such as systematic reading, the ability to report and speak effectively, the proper use of microscopy, and the application of statistical methods. The paper industry—being of such a nature and complexity that it reflects on a small scale the difficulties of the larger world—is particularly interesting in this respect; the scientist is brought at once to the necessity of using all his skill in partnership and cooperation with others. E.S.

SETUP BOXES

ANON. Progress in cigars. Modern Packaging 22, no. 6: 92-3 (February, 1949).

A description is given of a metal-topped humidifying cigar canister made of double-walled spiral-wound chipboard lined with aluminum foil for moisture retention and with cedar veneer for aroma. A leatherette cover paper is glued to the outside wall. The humidor compares favorably with wood cigar boxes in cost and weight. An inexpensive folding carton simulating the traditional cigar box is also described (*cf.* B.I.P.C. 19: 426). R.R.

SHIPPING CONTAINERS—TESTING

BERGSTROM, H. A. Proof of package adequacy through tests. Fibre Containers 34, no. 1: 102-3 (January, 1949).

A careful study of both physical and chemical characteristics of a product should be included in any preliminary investigation for determining package adequacy. After a choice has been made of the most logical type or types of packages that will perform the required service most economically, brief consideration should be given to standards and requirements already prescribed; these may outline routine tests which can be used or act as a guide in considering the packaging of products having no unusual characteristics. The work of ASTM Committee D-10 and its subcommittees on standard methods of testing shipping containers will greatly assist the packaging engineer. Four examples of actual packaging problems are given to show that the choice of specific hazard tests for proving package adequacy is not a simple one. Although the proper selection of the initial tests will indicate the satisfactory container, final proof can be secured only by actual use. R.R.

ROYCE, CLINTON. What's ahead for packaging in the defense program. Fibre Containers 34, no. 1: 25-6, 28, 30 (January, 1949); *cf.* B.I.P.C. 19: 270.

Following a summary of the organization of Armed Forces packaging groups, the author considers the proposal to eliminate different preservation and packaging requirements by different branches of the military for identical or similar parts, assemblies, and equipment in so far as possible. A discussion is given of the unit-of-issue problem, one of the most trouble-

some in military packaging. The types of packaging problems to be faced —e.g., the necessity for packages which will protect their contents at greatly varying temperatures against water and water vapor, corrosion, and fire, for new closures, etc.—are mentioned and the progress made in packaging material and container testing reported. The tests are divided into qualification or prepurchase qualifying and inspection or acceptance tests. Under a new system one agency will be designated to make a certain qualifying test, the results of which will be issued under that agency's name and for that particular product and will be accepted by all other government bureaus and services. The services are planning to standardize the requirements contained in many TAPPI and ASTM standards. Joint Army-Navy specifications are being studied to reduce the testing required and to devise more practical procedures for both qualification and inspection tests. R.R.

SILICATE OF SODA

MERRILL, REYNOLD C. Industrial applications of the sodium silicates; some recent developments. Ind. Eng. Chem. 41, no. 2: 337-45 (February, 1949).

Recent developments in the commercial applications of sodium silicates as adhesives, soap builders, detergents, metal cleaners, cements, and binders for briquets and other bonded materials are summarized. Basic principles involved in the applications are stressed and variations of physical properties with silica to alkali ratio and water content are illustrated. 116 references. E.S.

SOAP

ANON. Urge cobs and shells as abrasives in soap. Chemurgic Digest 8, no. 2: 16 (February, 1949).

Tests at the Northern Regional Research Laboratory show that ground sieved white corncobs and pecan and filbert shells with the paper-like lining removed make satisfactory additions to abrasive hand soaps. Red cobs are objectional because of their color. R.R.

STEAM POWER

DALE, W. B. Reducing and desuperheating plant for process steam. Proc. Tech. Sect. Paper Makers' Assoc. Gt. Brit. & Ireland 28, no. 1: 303-19; discussion: 320-3 (June, 1947).

The author discusses pressure reducing and desuperheating equipment for providing low pressure steam for process heating. The relative merits of saturated and superheated steam for this purpose are described, as well as the types, sizes, and installation of reducing valves, desuperheating plants, and the necessity for care in laying out desuperheater pipework and making flanged joints. E.S.

STORAGE BATTERIES

VAUGHAN, K. A. Battery maintenance. Paper Trade J. 128, no. 7: 22-3 (Feb. 17, 1949).

Directions for the preventive maintenance of storage batteries for materials handling equipment are given. E.S.

STREAM POLLUTION

WISELY, W. H. Stream pollution control activities of industrial associations. Sewage Works J. 21, no. 1: 51-62 (January, 1949).

A survey is presented of the activities of industrial associations for the elimination and prevention of stream pollution caused by industrial wastes. Information on past, current, and planned accomplishments is given according to the industry served; the activities of the pulp and paper industry are included. 20 references. E.S.

SULFATE MILLS

ANON. Rayon pulp mill to be erected in Mississippi will use hardwoods. Chem. Eng. 56, no. 2: 195 (February, 1949); *cf.* B.I.P.C. 19: 277.

The new rayon sulfate pulp mill of the International Paper Co. will be built on a 1000-acre site at Natchez, Miss. The new mill will be a market for about 270,000 cords of hardwoods and will produce about 300 tons of rayon pulp per day. It is estimated that it will require about 15 months to get the plant into operation, once it is started; it will employ about 800 persons. E.S.

DYCK, A. W. J. From wood to paper at KVP. Can. Chem. Process Inds. 33, no. 2: 120-3 (February, 1949).

An illustrated description is given of the operations of the Espanola mill of the Kalamazoo Vegetable Parchment Co. The wood, chiefly jackpine with some spruce and poplar, is floated down the Spanish River or, during the winter, transported by rail. After being slashed to 4-foot lengths, the logs are sent to two Waterous drum-barkers and then to the ten-knife Carthage chippers. About 40,000 cu. ft. of wood are processed daily by the sulfate process. The cooking is done in five digesters, each with a 20-ton capacity. Turpentine is recovered from this process at a rate of two gallons per ton of pulp. The indirect cooking method used yields a stronger pulp and results in improved color in the bleaching operation. The cooked pulp is diluted with black liquor to 2% consistency, passed through Jonsson knotters to the Oliver brown-stock washers, and pumped into screen stock tanks. The black liquor from the washers is concentrated to 60-65% solids content and processed in a Combustion Engineering recovery furnace; Cottrell precipitators recover about 1200 pounds of solids per hour from the flue gases of the furnace. The capacity of the electrolytic plant is 15 tons of chlorine and 16.5 tons of caustic soda per day, which are used in the six-stage bleaching of the sulfate pulp. A Kamyr machine forms the pulp into sheets and removes 70% of the water. R.R.

MACMILLAN, H. R. Profits create a new mill. Pulp & Paper 23, no. 2: 32, 34 (February, 1949).

Following a summary of the author's life, a report is given of the 200-ton bleached sulfate mill being built for the Nanaimo Sulfate Pulp Co. on Vancouver Island. The mill is to be in operation in the fall of 1950. Experimental work on a new type of hydraulic barker, said to be very effective and economical, may result in its being used in the new mill. The heat recovery unit and boilers are to be supplied by Combustion Engineering and the Vancouver Iron Works. The wet end of the 178-inch Fourdrinier will be built by the John Inglis Co. according to Pusey & Jones design; the slice, three extra heavy press sections, a six-body sextuple-effect black-liquor evaporator, four digesters, and some of the pumps will also come from Inglis. The 175-ton Flakt drier will be supplied by Paper Machinery Ltd. Dorr causticizing equipment will be installed. A map is included showing the sites of mills on or across the Straits from Vancouver Island, including the Nanaimo mill. R.R.

SULFITE PROCESS—MAGNESIUM BASE

BRAUNS, O. Sulfite cooking with magnesium oxide. Svensk Papperstidn. 52, no. 1: 20-1 (Jan. 15, 1949). [In Swedish] *cf.* B.I.P.C. 19: 277-8.

A brief illustrated description of the magnesium-base sulfite cooking process at Longview, Wash., is given. E.S.

CALLAHAM, JOHN R. Magnesia pulping process. Chem. Eng. 56, no. 2: 137-9 (February, 1949); *cf.* B.I.P.C. 19: 277-8.

The magnesium-base sulfite cooking process is outlined, which was recently put into operation by the Weyerhaeuser Timber Co., at Longview, Wash. E.S.

SULFITE WASTE LIQUOR

SCHWABE, KURT. Sulfur recovery from sulfite waste liquors. Holzforschung 3, no. 1: 5-23 (1948). [In German]

The results are based on experimental data obtained in 1944-5 by H. Fiedler and H. Schlosser. A comprehensive literature review with 36 references is included. The pyrolysis of dried powdered spruce sulfite waste liquor (from calcium bisulfite digestion) in the presence of carbon dioxide at approximtely 300° C. led to the recovery of a maximum of 72% of the sulfur as sulfur dioxide and hydrogen sulfide. Higher or lower temperatures resulted in lowered yields. Similar results are obtained in the presence of hydrogen at 300° C. Pyrolysis of a dried magnesium bisulfite waste liquor gave a recovery of over 80% sulfur at 400° C. (as sulfur dioxide and hydrogen sulfide) and well over 90% when the decomposition was carried out at 800° C. The residual magnesium oxide represents 80% of that used in the original cooking liquor. Magnesium sulfate (I) when heated with 16.5% dried sulfite waste liquor (II) for one hour at 625° C. gave rise to 79.2-81.7% of the sulfur [originally present in (I) and (II)] in the gaseous products. When pyrolyzed in the presence of 10.4% charcoal from ashwood, however, only about 55% of the original sulfur was recovered. This presents the possibility of obtaining magnesium oxide and sulfur dioxide (for magnesium bisulfite cooking liquor) from the relatively inexpensive (I). L.E.W.

SULFUR

CHEMICAL ENGINEERING. Sulphur and sulphuric acid. Chem. Eng. 56, no. 2: 112-13, 115 (February, 1949); *cf.* B.I.P.C. 18: 475.

Statistical information is given on the production and consumption of sulfur and sulfuric acid for the period 1946-48, some of the 1948 figures being estimates. Sulfur mining for 1948 is estimated at 4,820,000 long tons, about 379,000 tons more than in 1947; sulfuric acid production increased about 3% over the 1947 figure. In the three postwar years, 2,500,000 annual tons of capacity (100% acid basis) have been added, of which about 750,000 tons went into operation in 1948; the production was consumed without difficulty. Another 975,000 tons is scheduled for 1949, so that the nominal capacity may be about 13,000,000 tons by the end of this year. About 40,000 tons of elemental sulfur were produced from fuel gases in 1948; this quantity will increase considerably in 1949 and 1950. New recovery plants now being installed or projected for the near future are estimated to total about 120,000 tons per year. New sludge acid recovery systems, renewed interest in spent pickle liquor recovery, and the use of oxygen sulfur burning with oxygen in a closed cycle are developments which will bear watching. E.S.

SWELLING AND HYDRATION

INGERSOLL, H. G., and JOHNSON, A. A. Ionic exchange and fibre contraction. Nature 162, no. 4110: 225 (Aug. 7, 1948).

The authors found that water-swollen cellulosic fibers—when placed in aqueous salt, sugar, or glycerol solutions—contract rapidly at first and then increase in length. The contraction appears to be caused by water migrating out of the filament to establish osmotic equilibrium. Eventually, as the solute diffuses into the filament, the osmotic forces are reversed and water flows into the filament, causing an increase in length. The deswelling of three hydroxyethylcellulose filaments in glycerol, dextrose, and sugar solutions and reswelling in water after equilibrium has been established are shown graphically in a diagram. E.S.

TANNINS

LOLLAR, ROBERT M., and O'FLAHERTY, FRED. The domestic vegetable tannin situation. Northeastern Wood Utilization Council, Bull. no. 25: 87-98 (January, 1949).

With reference to the current acute shortage of vegetable tanning materials, which will become critical if chestnut should be entirely lost within the next 10 to 15 years without replacements, the author discusses the several possible solutions to the problem, including research so that existing sources of tanning materials can be more effectively utilized, the development of synthetic tanning materials, the detection and utilization of existing unused sources of vegetable tannins, and the development of cultivated sources of usable materials. Progress in all of these directions is possible. The final course of future development will depend upon which alternative can most economically supply the needed tonnage of tanning materials with the necessary varied characteristics. 12 references. E.S.

TEXTILE INDUSTRY AND FABRICS—TESTING

TONER, RICHARD K., BOWEN, CAROL F., and WHITWELL, JOHN C. Moisture determination in textiles by electrical meters. Part II. Textile Research J. 19, no. 1: 1-8 (January, 1949); *cf.* B.I.P.C. 19: 204.

The identical instruments (Hart moisture meter and Steinlite moisture tester) were used as in the first part of the article. In the second section, the authors report additional experiments with these testers, illustrating the effects on their calibration of temperature and heating history, dye, salt concentration, and fiber variation. Most of the tests have been made on wool; basic types of curves for cotton sliver and acetate staple fiber are also presented for the Steinlite meter. The results indicate that all variables affect the calibration sufficiently to require separate curves for each new condition if a high precision is to be maintained. However, when properly calibrated and used, the two meters give results comparable with those of oven analyses. 8 figures. E.S.

WASTE

ANON. Uses for rice hulls. Chemurgic Digest 8, no. 2: 12 (February, 1949).

Among the possible uses suggested for the approximately 300,000 tons of rice hulls produced annually in the United States are wallboard, linoleum, building blocks, and soundproofing and insulating materials, as an important source of furfural and, perhaps, cellulose for rayon, as an abrasive ash, and extenders for plywood glues and certain plastics. R.R.

WATER AND WATER TREATMENT

BALDWIN, HARRY E. TAPPI survey of water technology; review of the literature for 1947. Tappi 32, no. 2: 86-90 (February, 1949).

The author reviews the most important papers on the problems of water supply and treatment published in the literature of 1947. The following subheadings are used: iron and manganese removal; disinfection of the water supply; slime control; medication; main sterilization; taste, odor, and color removal; and special treatments of water for paper mills. 113 references. E.S.

LOVE, S. K. Water analysis. Anal. Chem. 21, no. 2: 278-84 (February, 1949).

A review is presented of methods of water analysis developed during the past five years and published in the technical literature; the subheadings used are: silica; aluminum and iron; calcium, magnesium, and hardness; sodium and potassium; copper; alkalinity; sulfate; chloride; fluoride; nitrate and nitrite; phosphate; dissolved solids; residual chlorine; dissolved oxygen; carbon dioxide; organic substances; and miscellaneous. 155 references. E.S.

WATER-MARKS

A. L. The watermarks. Ciba Rev. no. 72: 2666-7 (February, 1949).

To make the earlier watermarks, a figure in bent wire was soldered onto the network of the mold. Where the wire pressed into the pulp, the latter was thinned and the watermark was left. The first watermark known is found on paper made at Bologna in 1282. In the fourteenth century, intricate designs were in use, many of which were variants of the same motif. Interpretations of the marks as cabalistic signs are apparently unfounded, although they are undoubtedly connected with the customs of medieval crafts and gradually came to stand for the quality of the paper. Well-known marks were widely imitated which, with the unintended resemblances and numerous variants, makes it difficult to determine the origin and epoch of a paper from watermarks alone. The present-day design is soldered on the wire gauze of the dandy roll or is cast with the gauze in sharp relief. R.R.

WOOD—CHEMISTRY

WACEK, A., and EISNER, G. Absorption and fixation of phenol by sprucewood. Monatsh. 79, no. 6: 564-9 (December, 1948). [In German]

When treated with a dilute solution of phenol in xylene and concentrated hydrochloric acid (catalyst), extractive-free sprucewood meal takes up only a relatively small amount of phenol. On the other hand, when the wood meal is heated with an excess of (nearly pure) phenol containing hydrochloric acid, the irreversible fixation of phenol may reach 0.22-0.24 gram per gram of the original dry wood. The authors studied the effects of time, hydrochloric acid concentration, and temperature and found that, when 10-12 grams of dry wood meal were treated with 100-110 grams of phenol and 0.63 cc. of hydrochloric acid at 80° C., 1 gram of wood bound 0.22 gram of phenol after about three hours. In this case the ether-soluble portion of the phenol-treated wood was 0.28 gram (per gram of dry wood). When the time of treatment was limited to one hour, a concentration of 1.34 cc. of

hydrochloric acid gave nearly the same percentage of phenol fixation (0.21 gram of phenol per gram of wood). This was not increased by increasing the acid concentration to 2.68 cc., but the ether-soluble portion of the treated wood rose to about 0.32 gram per gram of wood. In a series of experiments in which only 0.08 cc. of hydrochloric acid was used for one hour, the irreversible fixation of phenol rose with rising temperatures. Methods used for determining phenol fixed by the wood (and of ether-soluble phenolic bodies) are fully described. L.E.W.

WOOD—EXTRACTIVES

ANDERSON, ARTHUR B., and GRIPENBERG, JARL. Antibiotic substances from the heart wood of *Thuja plicata* D. Don. IV. The constitution of β-thujaplicin. Acta Chem. Scand. 2, no. 8: 644-50 (1948).

The structure of β-thujaplicin, one of the toxic principles of the heartwood of *Thuja plicata* D. Don grown in the United States, has been elucidated. It is 1-isopropyl-2,5,7-cycloheptatrien-3-ol-4-one (1-isopropyl-1,4, 6-cycloheptatrien-4-ol-3-one) or β-isopropyltropolone. A short account of the distribution of the toxic principles in the heartwood of two samples of *Thuja plicata* is also given. E.S.

ERDTMAN, HOLGER, and GRIPENBERG, JARL. Antibiotic substances from the heart wood of *Thuja plicata* D. Don. II. The constitution of γ-thujaplicin. Acta Chem. Scand. 2, no. 8: 625-38 (1948); *cf.* B.I.P.C. 18: 796.

From the heartwood of western red cedar (*Thuja plicata* D. Don) grown in Sweden, "dehydroperillic acid," $C_{10}H_{12}O_2$, together with two isomeric, crystalline compounds which have been termed α- and γ-thujaplicin have been isolated. In addition to dehydroperillic acid, Anderson and Sherrard in 1932 working with American-grown wood isolated a compound which is identical with γ-thujaplicin. One of the liquid fractions obtained by them had crystallized in the meantime and from this material the authors isolated another isomeride ($C_{10}H_{12}O_2$) which has been termed β-thujaplicin. The structure of γ-thujaplicin, which is highly toxic to a great variety of fungi and to fish, has been elucidated. It contains a seven-membered ring and is 1-isopropyl-1,3,6-cycloheptatrien-4-ol-5-one or, on the basis of Dewar's suggestion to term this particular cycloheptatrienolone system tropolone, γ-isopropyltropolone. 23 references. E.S.

GRAHAM, H. M., and KURTH, E. F. Constituents of extractives from Douglas fir. Ind. Eng. Chem. 41, no. 2: 409-14 (February, 1949).

Investigation of the ether, acetone, and cold-water extracts from three different specimens of Douglas fir heartwood has established the presence of constituents not previously reported. In the ether extract were found oleic, linoleic, lignoceric, and abietic acids, phytosterol, and tannin. The fatty acids were present both in the free and combined states, whereas the resin acids were isolated only as the free acids. From the behavior of the tannin found in the ether extract, it appears that this substance was chemically associated with another component. A pentahydroxyflavanone and a catechol tannin and phlobaphene were isolated from the acetone extract. These substances absorb ultraviolet radiation in similar wave bands which indicates that they are structurally related. Approximately 70% of the cold-water extract was a galactan. 25 references. E.S.

GRIPENBERG, JARL. Antibiotic substances from the heart wood of *Thuja plicata* D. Don. III. The constitution of α-thujaplicin. Acta Chem. Scand. 2, no. 8: 639-43 (1948).

The structure of α-thujaplicin, one of the toxic principles of the heartwood of *Thuja plicata* D. Don, grown in Sweden, has been elucidated. It is 1-isopropyl-1,4,6-cycloheptatrien-2-ol-3-one (1-isopropyl-3,5,7-cycloheptatrien-3-ol-2-one) or α-isopropyltropolone. E.S.

HASSELSTROM, TORSTEN. On pine tree resenes in the biogenesis of the resin acids. Paper Trade J. 128, no. 7: 17-21 (Feb. 17, 1949).

The variations in composition of extractives obtained from various parts of the pine tree are emphasized. The resenes (the nonsaponifiable constituents free from steam-distillable terpenes contained in the resinous extractives of the pine tree) in these mixtures contain a series of compounds, which show an interesting diversification of physiological action. Extended research should be inviting in this very little-known field of pine tree reserves, considering their potential value as an untapped source for the production of vitamins and synthetic hormones. Presentation is made of a new carbonyl compound occurring in crude tall oil soap in amounts of 10% of the total resenes content. This constituent is tentatively identified as a ketone and named "tall oil ketone." In view of the more rapid progress in the adjacent fields of resin acids, sterols, and terpenes, the Sandermann hypothesis for the biogenesis of the resin acids from phytol is discussed and suggestions are made for its simplification. It is believed that new applications of these concepts may aid practical research in this largely unexplored field of wood chemistry. 48 references. E.S.

WOOD—MENSURATION

CANADA. *Department of Mines and Resources.* New form-class volume tables. Pulp Paper Mag. Can. 50, no. 2: 82, 84 (February, 1949).

The introduction is given from the second edition of the Department's "Form class volume tables" recently issued. The publication contains tables based on diameter, total height, and form for many coniferous trees and hardwood species. Four main types of tables have been developed for each species and form class: total volume and merchantable volume in cubic feet, board foot volumes for various log rules, and merchantable volume in cords. All volumes are the wood volume inside the bark. A discussion is given of some of the tables presented in the book. R.R.

JOERGENSEN, CHR. Increment percentage, its usefulness and a simplified method of computation. Pulp Paper Mag. Can. 50, no. 2: 75-8, 80 (February, 1949).

Although the use of percentage to express growth rate fails to indicate the influence of each of several important factors on the growth rate and must always be supported by explanatory comments, it does enable the layman to evaluate productivity more easily and is a valuable indicator of the productivity of single trees, a stand, or any unit which is uniform in some respect—e.g., age, diameter, species, etc. The main requirements of an ideal formula are that both diameter growth and height growth should be considered and that it be logarithmic or simple enough to permit the use of alignment charts or a slide rule. A method is described whereby such a figure can be calculated directly from data obtained by the increment borer

and the caliper without reference to the volume. The annual increment percentage is computed according to a formula analogous to the simple interest formula. The error is sufficiently small to make the method applicable in practical work. R.R.

WOOD ROOM

JONES, J. B. Wood—its preparation and measurement. Tappi 32, no. 2: 58-62 (February, 1949).

The more common methods of wood preparation as they are known in the East and particularly the methods in use at the plants of The Ontario Paper Company Limited are described. A flow sheet of the wood room at Thorold as designed to handle both barked and unbarked wood is shown. The various pieces of wood-barking equipment are described. Explanation is given of the volumetric system of wood measurement, with illustrations, and methods of wood write-off are described. Some comments are made on the importance of wood density in wood purchasing and pulp yield. E.S.

WOOL

LINDBERG, JOEL. Allwörden's reaction. Textile Research J. 19, no. 1: 43-5 (January, 1949).

Reference is made to Allwörden's reaction—i.e., the formation of blisters or sacks on the surface of undamaged wool fibers when treated with chlorine water; when the sacks fail to appear, it is taken as an indication of damage to wool. It has been assumed that the blisters are caused by a semipermeable membrane which is kept expanded by osmotic pressure, for which some protein degradation product is responsible. Nothing has been known about the nature of this membrane. Electron microscopic investigations showed that the material is dense and homogeneous, without pattern or structure; it has the same thickness of about 100 A. everywhere and can, therefore, not be seen in the optical microscope. The membranes seem to form a skin on the wool surface. However, a reaction depending upon a layer of a thickness of about 100 A. must be considered too sensitive to be useful for practical purposes. Other reactions for observing wool damage depend also on the condition of the membrane. The extreme sensitivity of the test by Whewell and Woods (*cf.* B.I.P.C. 14: 434-5) can be explained by it. One electron micrograph showing part of the membrane shadowed with gold is included. 12 references. E.S.

SHEMA, B. F., and APPLING, J. W. Determination of bacterial degradation of woolen fibers. Tappi 32, no. 2: 78 (February, 1949).

A method for determining the bacterial degration of the woolen fibers of papermakers' felts is described briefly. Several threads from representative samples of the damaged felt are unravelled in the woof and warp directions, washed in several changes of distilled water to remove all extraneous matter, and dried between bibulous paper. The fibers are then immersed in a 1% aqueous solution of safranin, removed from the stain after one minute, washed in distilled water, dried between bibulous paper, and mounted in glycerin for microscopic examination. The degree of bacterial degradation is determined by the extent to which the fibers absorb the stain. 4 illustrations. E.S.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents are available only as manuscript or photostatic copies. They are furnished by the Commissioner of Patents, Ottawa, Canada. An estimate of the cost of a patent should be obtained in advance of the order.

ADHESIVES

SPEYER, FRED B. Adhesive and coating composition. U. S. patent 2,461,704. Filed Nov. 23, 1945. Issued Feb. 15, 1949. 1 claim. Assigned to Shellmar Products Corporation.

A pressure-sensitive greaseproof adhesive suitable for laminating and combining purposes (plastic films, paper, and foils) has the following approximate composition: polymerized linseed oil (e.g., Kem-Pol) 5 parts, chlorinated rubber (e.g., Parlon) 1 part, microcrystalline wax 0.5 part, ethyl acetate 5 parts, and toluene 1 part. Such a composition has good low-temperature flexibility and will not delaminate at —15° C. C.J.W.

BARKERS AND BARKING

ROBERTSON, CHARLES J. Impact type log peeler. U. S. patent 2,461,924. Filed Nov. 27, 1945. Issued Feb. 15, 1949. 4 claims.

The log is subjected to a whipping action produced by rotary flexible members; the whipping action also effects rotation of the log and endwise movement thereof; the latter is controllable so that the barked surface of the log is not injured by the debarking members. C.J.W.

BLEACHING

BLOCH, RUDOLF, GOLDSCHMID, KURT, SCHNERB, ISAAC, and GOLDSCHMIDT, PAUL. Bleaching of cellulosic matter. U. S. patent 2,461,105. Filed Dec. 17, 1946. Issued Feb. 8, 1949. 10 claims.

The hypochlorite bleaching of pulp is carried out in the presence of bromine ion; the bleaching operation is markedly accelerated and a lower concentration of hypochlorite can be employed. In an example, 2000 liters of pulp at 5% consistency is treated with 280 liters of calcium hypochlorite (7 kg. available chlorine) and 600 liters of 0.5% potassium bromide; the time of addition is about 45 minutes and the temperature of the bath is 45° C.; the bleaching is complete in 55 minutes. Kraft pulp is treated with a hypochlorite solution containing 10% chlorine and 0.2 to 0.5% bromide ion; the free chlorine is exhausted in 50 to 70 minutes; the pulp, after washing with 2% sodium hydroxide, is treated with 2.5% free chlorine with the addition of a small quantity of bromine ion; the second stage is

complete in from 50 to 120 minutes. The operations are carried out at a pH of 7 to 8.2. C.J.W.

BOARD SPECIALTIES

LEBOLD, SAMUEL N. Bottle holder. U. S. patent 2,460,229. Filed Sept. 27, 1947. Issued Jan. 25, 1949. 4 claims. Assigned to Morris Paper Mills.

This is a continuation of U. S. patent 2,389,318 (Nov. 20, 1945) and relates to the method of construction of a bottle carrier and holder from a comparatively lightweight paperboard. C.J.W.

RILEY, MELVIN A., and MCCLELLAND, DONALD C. Bottle carton. U. S. patent 2,462,676. Filed April 16, 1946. Issued Feb. 22, 1949. 6 claims. Assigned to The Baltimore Paper Box Company.

The construction of a bottle carrier is disclosed which can be shipped with the top of the carton in a flat condition but with the top of the carton so constructed that handles which are within the carton during shipment may be exposed readily to permit the carton to be carried by hand after sale. C.J.W.

SMITH, RICHARD E., and MUSSO, PAUL A. Collapsible carrier. U. S. patent 2,460,108. Filed Aug. 31, 1946. Issued Jan. 25, 1949. 1 claim. Assigned to C. Schmidt & Sons, Inc., and Kieckhefer Container Company.

This patent relates to a single blank for forming a collapsible bottle carrier. C.J.W.

STORY, CHARLES F. Ligno-cellulose die-stock and process of making. U. S. patent 2,459,851. Filed Dec. 31, 1941. Issued Jan. 25, 1949. 2 claims. Assigned to Masonite Corporation.

Thick dense slabs having high bond strength and a low percentage of water-soluble material are formed from steam-treated and exploded ligno-cellulosic material in the form of relatively thin boards (about ⅛-inch thick) having a moisture content of 3 to 8% by subjecting a stack of such boards with a heat-reactive adhesive between successive boards of the stack to a pressure of about 1200 p.s.i. between platens heated to about 165° C. until the temperature at the center of the stack was about 138° C., after which the platens were cooled with water; the completed core was about 1.25 inches thick. Three plies of the original fiberboard were applied to each side of the core, with "Tego" glue sheets between each layer and the whole subjected to a pressure of 1200 p.s.i. and a temperature of 182° C. (temperature of the new glue films was 134° C. and that of the core center 106°), thus giving a slab about 2 inches thick. Such a product had a specific gravity of 1.34, a modulus of rupture of 10,725 p.s.i., a bond strength of 544 p.s.i., and a Rockwell hardness of 51-70 (M scale). C.J.W.

DIELECTRICS

GARDNER, GUY B. Regenerated cellulose dielectric material and process of producing the same. U. S. patent 2,460,282. Filed July 22, 1941. Issued Feb. 1, 1949. 7 claims. Assigned to Aerovox Corporation.

A method of treating cellophane to produce a dielectric for electrostatic condensers consists in removing acid, alkali, and softening agents (e.g.,

glycerol) by washing with alcohol and then with water at 175 to 190° F., with a final washing with alcohol. It is stated that fillers could be used with the purified cellophane; these include solid insulating materials such as paraffin, halowax, ceresin wax, or liquid dielectrics such as mineral or vegetable oils, chlorinated diphenyls, phosphates, and the like. C.J.W.

DISPENSING CONTAINERS

BERG, EDWARD C. Dispensing container. Canadian patent 454,441. Filed May 2, 1947. Issued Feb. 1, 1949. 9 claims. Assigned to Marshal I. Williamson.

A dispensing container consists of an outer shell and a cardboard container slidable therein. The shell has at least one wall composed in part of a double layer of cardboard, the inner layer being arranged in the form of two tabs. Other details are given. C.J.W.

THOMPSON, OSCAR T. Tear-out strip for dispensing boxes. Canadian patent 454,650. Filed March 10, 1947. Issued Feb. 15, 1949. 1 claim. Assigned to International Cellucotton Products Company.

A box has a wall provided with an elongated narrow tear-out strip; its construction is described. C.J.W.

FLAX

WELLS, SIDNEY D. Preparation of paper-making fibres and other useful materials from straw. Canadian patent 454,508. Filed Aug. 1, 1945. Issued Feb. 8, 1949. 5 claims. Assigned to The Institute of Paper Chemistry.

This is the same as U. S. patent 2,452,533 (Oct. 26, 1948); *cf.* B.I.P.C. 19: 289. C.J.W.

FLOOR COVERING

SEEDORF, RALPH F. Felt base material for adhesive attachment to surfaces and coating composition for same. U. S. patent 2,460,787. Filed April 30, 1945. Issued Feb. 1, 1949. 9 claims. Assigned to Carthage Mills, Inc.

A coating composition for felt base materials (e.g., those saturated with asphalt) consists of water 28.2%, dry rosin size 10.5%, china clay 17.5%, slate flour 35%, and naphtha 8.8%; in another type, in which partial saponification occurs during manufacture, the components are water 27.1%, soda ash 0.6%, caustic soda 0.5%, rosin 2.2%, crude tall oil 5%, china clay 16.7%, slate flour 41.8%, and naphtha 6.1%. These coatings are not adhesives in themselves but serve as intermediaries between the felt base and the applied adhesive. The materials can be cemented to wood, wallboard, plasterboard, plaster, concrete, and other types of materials. C.J.W.

FOLDING BOXES

LUPTON, ELMER H. Egg crate. U. S. patent 2,460,020. Filed Jan. 8, 1945. Issued Jan. 25, 1949. 3 claims. Assigned to The Bartgis Bros. Company.

The egg crate structure, box, partitions, and barriers are formed from a single blank and kept in a single homogeneous sheet before bending. The

bending operation provides not only the partitions but also a series of incidental barriers that are suitably cut and perforated and form bottom, top, and side supports for the eggs and a buffer arrangment that serves to keep the eggs spaced resiliently from the bottom and top panels of the crate. The eggs can be removed without loosening the closed container but the crate must be partially destroyed to extract the eggs therefrom. C.J.W.

WHITTAKER, ALVIN. Folding box. U. S. patent 2,461,618. Filed Oct. 9, 1945. Issued Feb. 15, 1949. 1 claim.

Details are given of the construction of a folding box for packaging dresses, sweaters, and other wearing apparel which is provided with a metallic or plastic handle. The construction not only properly positions the removable handle but holds the bail of the handle against lateral movement. C.J.W.

MACHINERY—CONSISTENCY REGULATORS

STAEGE, STEPHEN A. Paper machinery. Canadian patent 454,378. Filed July 25, 1946. Issued Feb. 1, 1949. 8 claims. Assigned to The Black-Clawson Company.

In connection with the forming member of a paper machine which is adapted to operate under a predetermined liquid level and means for supplying stock and recirculating the white water, a chamber is provided in which the liquid level varies in corresponding relation with that effective on the forming member; associated with this chamber are means for varying the liquid level, including an electrode assembly for sensing the level of the liquid in the chamber. C.J.W.

MACHINERY—CONVERTING MACHINERY

KUCKLINSKY, WALTER H. Box folding machine and method. U. S. patent 2,462,513. Filed Sept. 26, 1947. Issued Feb. 22, 1949. 17 claims.

The patent covers a box-folding machine and a method of effecting folds in blanks of thin materials such as paper and cardboard, such folds being along lines at substantial angles to the path of travel of the blanks while such blanks travel continuously. 22 figures. C.J.W.

LISLE, WADE H. Box shaping machine. U. S. patent 2,460,892. Filed Oct. 14, 1946. Issued Feb. 8, 1949. 2 claims. Assigned to Crook Paper Box Company.

A box-shaping machine has a mechanism for flexing the side walls of the box as it is advanced in such a manner as to exert an additional inward bend to the box at the lines of fold to prevent outward bulging of the side wall when the finished box leaves the machine. The construction of the mechanism is described and illustrated. C.J.W.

MACHINERY—CUTTERS

WEYENBERG, JOHN T. Web severing method and apparatus. U. S. patent 2,461,246. Filed Aug. 21, 1944. Issued Feb. 8, 1949. 6 claims. Assigned to Paper Patents Company.

A means is described for changing reels in a rewinder and for starting the paper on the new reel which eliminates the dangers of hand methods and also prevents undue waste in the operation. C.J.W.

MACHINERY—MIXING APPARATUS

ENGERT, GEORGE A. Mixing box. U. S. patent 2,460,626. Filed July 26, 1946. Issued Feb. 1, 1949. 3 claims. Assigned to Cheney Bigelow Wire Works.

A mixing box for use on a cylinder machine is so constructed that the stock from the head or gate box is mixed with the recirculated white water in an annular cylindrical vessel of restricted volume in such a manner that ample turbulence occurs to mix the stock and water thoroughly. The cylindrical wall is continued above the annular bottom portion so that the cross-sectional area is enlarged to permit substantial reduction in the velocity of flow and the turbulence; thus, the tendency to produce foam is greatly reduced. The upper portion of the cylindrical duct can be adjusted in height so that the flow of stock over the rim is free from turbulence and tendency to foam, and yet is active enough to prevent agglomeration of the dispersed fiber. The outlet from the pool conducts the stock to the vat of the cylinder machine. S.D.W.

MACHINERY—PAPER MACHINE

CLEM, EVERETT W. Fourdinier paper making machine. Canadian patent 454,526. Filed May 26, 1947. Issued Feb. 8, 1949. 5 claims. Assigned to Rice Barton Corporation.

This is the same as U. S. patent 2,421,829 (June 10, 1947); *cf.* B.I.P.C. 17: 671. C.J.W.

MACHINERY—PASTING MACHINE

BINSACK, JOSEPH W. Carton closing machine. U. S. patent 2,462,460. Filed Dec. 8, 1945. Issued Feb. 22, 1949. 5 claims. Assigned to Beech-Nut Packing Company.

A machine is claimed for closing and sealing containers, such as shipping cartons made of corrugated cardboard. Means are provided to insure that, as each carton approaches the spreader or other device for operating on the side flaps, the side flaps will be open sufficiently to insure engagement thereof with the sides of the spreader. C.J.W.

MINKOW, ROBERT. Gluing machine. U. S. patent 2,461,388. Filed May 21, 1945. Issued Feb. 8, 1949. 1 claim. Assigned to Minco Products Corp.

The invention covers a glueing machine for either thin or thick sheets and particularly an improved table construction which can be moved to an inoperative position for filling and for cleaning the glue or doctor roller. C.J.W.

MACHINERY—PRINTING MACHINE

FELDMEIER, FRANK. Sheet stretching mechanism. U. S. patent 2,461,376. Filed May 28, 1947. Issued Feb. 8, 1949. 3 claims. Assigned to Blaw-Knox Company.

A mechanism is described for gripping sheet material at its lateral edges while supported on a moving surface to stretch the sheet material and maintain it in a flat position on the surface. Its principal use is in printing in which an ordinary roller cannot be used with freshly printed sheets. C.J.W.

MACHINERY—PUMPS

COOK, ERNEST P. Rotary pump for thick fibrous suspensions. U. S. patent 2,460,278. Filed Feb. 4, 1944. Issued Feb. 1, 1949. 36 claims. Assigned to Improved Paper Machinery Corporation.

The construction of a rotary-piston displacement pump is described. It is adapted to pulp and other suspensions of relatively high consistency. C.J.W.

MACHINERY—SCUTCHERS

COOK, JOHN V. Machine for breaking fibrous materials. U. S. patent 2,460,448. Filed Aug. 31, 1943. Issued Feb. 1, 1949. 2 claims.

A portable machine is described which is adapted to breaking and scutching fibrous stalks of hemp, flax, sisal, and the like and separating the pith or woody matter from the fibers. C.J.W.

MACHINERY—SLITTERS AND WINDERS

HASWELL, HENRY L. Web tensioning and pressure mechanism. U. S. patent 2,460,694. Filed Aug. 8, 1945. Issued Feb. 1, 1949. 16 claims. Assigned to Ecusta Paper Corporation.

A mechanism for a slitting and rewinding machine regulates the tension on the web from the supply roll and controls the operation of the rewind roll so as to obtain tight uniform rewinding of the web or slit portion thereof. Features include the hydraulic brake and pressure control system which automatically maintains the proper tension on the rewind rolls to obtain smooth even winding of the material and a differential drive connection for the winding drums so that compensation is automatically obtained for differences in tension on the slit portions of the web delivered after the slitting operation. C.J.W.

SCHEUERMANN, JOSEPH S., and CARTER, THOMAS N. Tension control means for running webs. U. S. patent 2,462,558. Filed June 15, 1944. Issued Feb. 22, 1949. 4 claims. Assigned to Cameron Machine Company.

A method is claimed for accurately and quickly controlling the tension of a web of paper when it is unwound from one roll, passes through a processing machine (such as a printing press), and is rewound into a second roll. The mechanism can be used also for simply rewinding a roll of paper. C.J.W.

MOLDED PULP ARTICLES

WYSS, OSWALD. Process of producing moulded bodies from fibrous material. Canadian patent 454,402. Filed Aug. 1, 1946. Issued Feb. 1, 1949. 1 claim. Assigned to Interwood A.G.

A method is claimed for forming molded bodies having recesses and insets mounted therein. The recess is formed in the hot pressed body by means of a thin shell of sheet iron or other rigid material, after which the inset is introduced. C.J.W.

PAPER—COATED

BEYNON, NATHAN T. Flexible wrinkle coated material and method of producing same. U. S. patent 2,460,485. Filed may 21,

1948. Issued Feb. 1, 1949. 11 claims. Assigned to New Wrinkle, Inc.

In the preparation of flexible, wrinkle-coated paper and the like, the coating composition may consist of 100 parts by weight of a wrinkling oil (an unsaturated fatty oil containing conjugated double bonds), 40 parts of polyvinyl chloride, 60 parts of pigment paste, and 10 parts of naphtha. The compositions can be applied by spraying, spreading, or rolling. C.J.W.

FISHER, HARRY C. Method of production of coated board and paper. Canadian patent 454,478. Filed Jan. 12, 1944. Issued Feb. 8, 1949. 24 claims. Assigned to Consolidated Water Power and Paper Company.

This is the same as U. S. patent 2,419,207 (April 22, 1947); *cf.* B.I.P.C. 17: 597. C.J.W.

GREEN, BARRETT K. Coating for paper. Canadian patent 454,513. Filed Oct. 18, 1947. Issued Feb. 8, 1949. 16 claims. Assigned to The National Cash Register Company.

This is the same as U. S. patent 2,374,862 (May 1, 1945). A paper sheet is coated with a rupturable solid continuous film having within it two types of oil inclusions which are chemically separated from each other but, when the coating is ruptured by a stylus or printing type, a localized marking is produced, by chemical reaction, on an undersheet. C.J.W.

NELSON, HARLEY E. Method of coating paper. U. S. patent 2,460,998. Filed March 20, 1944. Issued Feb. 8, 1949. 3 claims. Assigned to Stein, Hall & Co., Inc.

Paper is coated with an acid-deflocculated clay and a starchy polysaccharide film-forming binder, dried, and treated with a resinous condensation product such as urea- or melamine-formaldehyde resin, with a subsequent heating to insolubilize the resultant coating. The papers are suitable for printing operations in which a high wax test and resistance to wet rub are required. In the preparation of the coating composition 102 parts of a chlorinated starch in 300 parts of water are cooked 10 minutes at 200° F. and diluted to 552 parts by weight with water. This is added to 600 parts of H.T. coating clay in 560 parts of water containing 0.25 to 0.5% sodium acid pyrophosphate as a deflocculating agent. This composition is applied to paper in any conventional manner, and the paper is air dried to a moisture content of 2 to 7%. The coated paper is then treated with a 2% solution of a urea-formaldehyde water-soluble resin (e.g., Plaskon) (the coated side or both sides can be treated), after which the paper is heated (approximately 30 seconds) by passing it over a roll heated internally with steam, the temperature being about 250° F. The coated sheets show a Dennison pick test of about 8 as compared with 5 for a sheet not treated with the resin. The resin solution cannot be applied with the film-forming binder. Other types of starches can be employed. C.J.W.

PAPER CONDITIONING

CRABTREE, KAY. Manufacture of paper. U. S. patent 2,461,109. Filed Sept. 30, 1944. Issued Feb. 8, 1949. 1 claim.

In the seasoning of paper to eliminate curling and wavy characteristics, the paper as it leaves the machine is passed over a hollow "seasoning" drum through which is circulated a cooling liquid to chill its surface. The paper is properly seasoned by the cooling effect of the drum and also by the

moisture which is absorbed by the paper (this moisture collects as condensate on the chilled drum surface). The cooling agent may be water, brine, or other liquid which has been cooled to a predetermined temperature—e.g., 41° F. The drum may constitute the expander of a refrigerating circuit of the compressor-condenser expander type. C.J.W.

PAPER SPECIALTIES

BALL, CHARLES O., and SCOTT, FRANKLIN D. Container. U. S. patent 2,461,251. Filed March 12, 1945. Issued Feb. 8, 1949. 4 claims. Assigned to Owens-Illinois Glass Company.

A container for milk and other liquids is so constructed that joints at the bottom corners are avoided; the corners are reinforced and protected in a manner to give greater strength and resistance to leakage. C.J.W.

BAUM, ROBERT A., and MACRILL, JOHN R. Citrus wrapper. Canadian patent 454,631. Filed June 7, 1946. Issued Feb. 15, 1949. 6 claims. Assigned to Fernstrom Paper Mills, Inc.

This is the same as U. S. patent 2,443,795 (June 22, 1948); *cf.* B.I.P.C. 18: 884. C.J.W.

CALLINAN, THOMAS D. Asbestos impregnated with tin oxide and process of producing. U. S. patent 2,460,734. Filed Oct. 4, 1944. Issued Feb. 1, 1942. 2 claims. Assigned to General Electric Company.

The tensile strength and dielectric properties of a flexible asbestos paper containing 70 to 80 parts of asbestos and 20 to 30 parts of clay are improved by impregnating the paper with an aqueous solution of alpha-stannic oxide and heating to about 60 to 100° C. to convert the alpha- into the beta-oxide. C.J.W.

CAMERON, DANILE D. Flame-resistant paper and process for its manufacture. Canadian patent 454,507. Filed April 8, 1947. Issued Feb. 8, 1949. 7 claims. Assigned to Hercules Powder Company.

Pulp in the beater is treated with from 5 to 40% (on the dry pulp basis) of a metal compound selected from the group comprising the oxides and sulfides of arsenic, antimony, tin, or bismuth, and from 5 to 40% of a halogenated organic material (e.g., a chlorinated hydrocarbon). C.J.W.

DAVIS, LEWIS, and TUUKKANEN, EDWIN C. Sealing and reinforcing tape. U. S. patent 2,462,037. Filed Jan. 11, 1943. Issued Feb. 15, 1949. 3 claims. Assigned to McLaurin-Jones Co.

An adhesive suitable for a sealing and reinforcing tape consists of ethylcellulose 4 parts, Staybelite 7 parts, and Hercolyn 2 parts. The components are melted at a temperature of 240 to 280° and applied to the backing sheet or the constituents can be dissolved in ethyl acetate, ethyl alcohol, acetone, or toluene and applied in the form of a solution. The preferred backing sheet is a laminated kraft paper known as Sisalkraft. In place of Staybelite, Staybelite esters or ester gums can be used; part or all of the Hercolyn can be replaced by Abalyn (methyl abietate) or Flexalyn (diethylene glycol abietate); dibutyl phthalate or tricresyl phosphate can be used. C.J.W.

FINLAY, WALTER L., and HUTCHINSON, GILBERT E. Shot shell. U. S. patent 2,462,312. Filed Aug. 2, 1944. Issued Feb. 22, 1949. 4 Claims. Assigned to Remington Arms Company, Inc.

The patent covers a filler wad column for a shot shell so prepared as to furnish both an improved gas seal and a yieldable pressure-transmitting cushion. A relatively porous and compressible wad is impregnated with high melting point waxes of animal, vegetable, mineral, or synthetic origin which will not run at temperatures below 120° F. The base wad is preferably rolled from a strip of paper which is crinkled or otherwise provided with corrugations, so that the completed wad will have an elasticity comparable with that of the body of the shell. C.J.W.

SHAFFER, MORTON J. Bellows type envelope having all edges of mouth reinforced. U. S. patent 2,460,909. Filed March 8, 1946. Issued Feb. 8, 1949. 1 claim.

The method of production of an expansible envelope of the bellow type, suitable for filing purposes, is described. C.J.W.

SLIFKIN, SAM C. Photosensitive paper. Canadian patent 454,396. Filed Nov. 8, 1946. Issued Feb. 1, 1949. 7 claims. Assigned to General Aniline & Film Corporation.

A diazotype sensitized paper is coated with a sensitizing solution containing a light-sensitive diazo compound and precoated with a surface sizing containing hydroxyethylcellulose. C.J.W.

STAFFORD, STEPHEN B. Method of making cockle paper. U. S. patent 2,460,042. Filed Jan. 13, 1945. Issued Jan. 25, 1949. 2 claims. Assigned to Rice Barton Corporation.

Paper is impregnated with a suitable animal or vegetable sizing material, such as glue, starch, a converted starch, soybean flour, casein, a synthetic resin, a cellulose derivative, or a mixture of these and dried in a horizontal position by suitably applied heat, being moved forward under a controlled light tension. In the preferred arrangement the paper is subjected to a heated air current directed against the under side of the sheet. This produces an uneven shrinkage and the desired cockle effect. C.J.W.

PHYSICAL TESTING—MOISTURE

CILLEY, PUTNAM. Apparatus for measuring humidity. U. S. patent 2,461,310. Filed May 21, 1947. Issued Feb. 8, 1949. 5 claims. Assigned to Foxboro Company.

A humidity measuring device consists of a sheet of hygroscopic material (paper), an electrical resistance element bonded to the sheet, and an electrical resistance measuring circuit. Changes in the dimension of the paper produce changes in the dimension and electrical resistance of the element. The device is useful for measuring the moisture content of a web of paper on the machine. C.J.W.

PULP STONES

HOLTER, NORMAN F. Pulpstone. Canadian patent 454,517. Filed Jan. 30, 1947. Issued Feb. 8, 1949. 4 claims. Assigned to Norton Company.

The construction of a pulpstone is claimed. C.J.W.

JEPPSON, GEORGE N. Pulpstone. Canadian patent 454,516. Filed Oct. 16, 1946. Issued Feb. 8, 1949. 7 claims. Assigned to Norton Company.

This is the same as U. S. patent 2,447,943 (Aug. 24, 1948); *cf.* B.I.P.C. 19: 137. C.J.W.

ROOFING FELTS

ADAMS, FLOYD W. Apparatus for saturating fabrics. U. S. patent 2,462,297. Filed April 9, 1945. Issued Feb. 22, 1949. 5 claims. Assigned to Los Angeles Paper Box Factory.

An apparatus is described for saturating or impregnating dry felt for use as a roofing material. The saturating means consists of two or more saturating platens (cast iron or steel plate) which can be heated with superheated steam or the like. In the case of asphalt, the platens are heated to about 500° F. by means of Dowtherm vapor. Each platen has one or more openings by means of which the saturant is supplied to the felt. The felt is carried on a perforate belt conveyor (e.g., a woven wire mesh). Since the saturant is picked up by one side only of the fabric, any moisture in the felt can escape from the other side, thus eliminating a principal cause of foaming. Finally, the felt is passed through a dipping tank for final saturation and then through doctor blades to remove the excess saturant. C.J.W.

KILLINGSWORTH, JOSEPH L. Shingle. U. S. patent 2,460,353. Filed May 9, 1946. Issued Feb. 1, 1949. 5 claims.

The method of forming an interlocking roofing shingle of T-shape which can be cut from a sheet of material of set width and which provides double coverage at every point on a roof is described. C.J.W.

SHIPPING CONTAINERS

BRUCKHAUSER, WILLIAM K. Box. U. S. patent 2,460,870. Filed Nov. 13, 1945. Issued Feb. 8, 1949. 3 claims. Assigned to International Paper Company.

A paperboard box fabricated of corrugated board and the like and suitable for packaging tomatoes and the like has a reinforced structure in which the end walls are adapted to receive and securely hold end portions of a removable lid. C.J.W.

GRAMPP, HAROLD J. Waterproof shipping container. U. S. patent 2,461,209. Filed Dec. 10, 1946. Issued Feb. 8, 1949. 18 claims. Assigned to Hercules Powder Company.

The construction of a waterproof shipping container for explosive cartridges is described. The tubular receptacle is made of a laminated paper; the end closure is made of laminated paper, heavy cardboard, or the like with a fluted end wall between, the latter being formed by crimping the tubular body portion of the receptacle or the cover inwardly to form the symmetrically fluted end wall. The central cavity formed by the ends of the flutes of the end wall is filled with a waterproof, thermoplastic adhesive. C.J.W.

HILL, IRVING, and HILL, JUSTIN D. Container. U. S. patent 2,459,939. Filed July 8, 1946. Issued Jan. 25, 1949. 2 claims. Assigned to The Lawrence Paper Company.

A method is described for forming containers of the knockdown type adapted for shipping eggs, fruits, vegetables, and the like. C.J.W.

SOUTHWICK, CHARLES A., JR. Container. Canadian patent 454,419. Filed April 19, 1947. Issued Feb. 1, 1949. 4 claims. Assigned to Shellmar Products Corporation.

A knockdown container is provided with an inner bag having a flat bottom and side walls with re-entrant folds. The flat bottom is secured to a bottom closure section of the container; one of the re-entrant folds is secured to a side-wall panel and a side wall of the bag is secured to an adjacent wall of the container. C.J.W.

SHIPPING CONTAINERS—BARRELS

HAGOPIAN, VAHAN. Method of making containers. U. S. patent 2,460,820. Filed March 18, 1944. Issued Feb. 8, 1949. 6 claims.

Cup-shaped plies of felted material, such as paper stock, hemp, jute, and the like, are formed by a conventional procedure, and coated or impregnated with a thermoresponsive adhesive; two or more such plies are nested to form a laminar set, and the whole is bonded by pressure applied through an inflatable bag. The product is suitable for use as barrels and the like. C.J.W.

SHIPPING CONTAINERS—FIBER DRUMS

WILSON, ALLEN B. Container and method of manufacture. U. S. patent 2,461,581. Filed Dec. 23, 1944. Issued Feb. 15, 1949. Assigned (one half each) to Kimberly Stuart and Elizabeth R. B. Stuart.

A shipping drum or container formed of paper or fiber is reinforced at each end with metal rims or beads. The end closures are of paper or board. The method of forming such containers is described. C.J.W.

SHIPPING CONTAINERS—MULTIWALL BAGS

HOPPE, EDGAR B. Multiply pasted end bag. U. S. patent 2,460,886. Filed Dec. 3, 1946. Issued Feb. 8, 1949. 2 claims. Assigned to St. Regis Paper Company.

A multi-ply paper bag has a pasted end closure of high strength, wherein each ply is secured independently of and without necessarily relying on the strength of the other plies. The margins of the plies of the bag are so formed that each individual ply is presented at the pasted closure in a manner to accomplish this result. The method of sealing is described. C.J.W.

HOPPE, EDGAR B. Multiply pasted end bag with sealed inner ply. U. S. patent 2,460,885. Filed Dec. 9, 1944. Issued Feb. 8, 1949. 2 claims. Assigned to St. Regis Paper Company.

A multi-ply pasted-end bag is provided with a sealed inner ply which prevents the contents of the bag from contacting any portion of any ply except the inner ply. The method of sealing is claimed. C.J.W.

SOY-BEAN

ERKKO, EERO O., and TRELFA, RICHARD T. Process for the isolation of soybean protein. U. S. patent 2,460,627. Filed Sept. 7,

1946. Issued Feb. 1, 1949. 7 claims. Assigned to Hercules Powder Company.

Oil-free soybean meal is soaked in water acidified to substantially the isoelectric point of the protein (pH 4.78), the resulting slurry is passed through a buhrstone or similar type mill to release the greater portion of the insolubilized protein from the cell walls of the meal, the slurry is passed over a suitable screen, the fibrous residue is leached with alkali, and the extract is acidified to precipitate the dispersed protein. C.J.W.

TALL OIL

HOUPT, ALFRED G. Recovery of rosin acids. U. S. patent 2,463,274. Filed Sept. 27, 1945. Issued March 1, 1949. 4 claims. Assigned to American Cyanamid Company.

This is a continuation of U. S. patent 2,285,902 (June 9, 1942). After separation of the major portion of the fatty acids as the sodium salts, the secondary amyl alcohol filtrate is made acid with sulfuric acid in amyl alcohol (0.25 to 5% excess); the acid facilitates the esterification of any remaining fatty acids and catalyzes the transformation of amorphous resinic acids to crystallizable abietic acid. The amyl alcohol is removed by steam distillation, the rosin acid residue is dissolved in petroleum ether (b.p. 90-130° C.), and the rosin acids are recovered from the solution. Details of the operation are given. C.J.W.

TEXTILE INDUSTRY AND FABRICS—FIREPROOFING

CAMPBELL, KENNETH S., and SANDS, JACK E. Fireproofing compositions. U. S. patent 2,462,803. Filed March 23, 1945. Issued Feb. 22, 1949. 9 claims. Assigned to the United States of America as represented by the Secretary of Agriculture.

A flameproofing agent is applied in the form of a noninflammable emulsion. One such emulsion is formed of chlorinated paraffin wax (70% chlorine content) 16%, mineral spirits (boiling range 350-375° F.) 26.23%, stearic acid 3.2%, water 37.16%, urea-formaldehyde condensation product 9.6%, triethanolamine 1.41%, and antimony oxide (about 325 mesh) 6.4%. Another emulsion has the composition: chlorinated paraffin wax (70% chlorine content) 10.7%, chlorinated paraffin wax (42-45% chlorine content) 10%, oil-modified alkyd resin (of the type which promotes a water-in-oil emulsion) 2%, mineral spirits (boiling range 350-375° F.) 22.4%, water 36%, urea-formaldehyde condensation product 9%, antimony oxide (about 325 mesh) 9.9%. The increase in fabric weight is not more than 25%. Air permeability is decreased only to a moderate degree. Although the illustrations use cotton textiles, the emulsions are said to be applicable to paper. C.J.W.

FISCHER, EARL K. Fire-retarding compositions. U. S. patent 2,461,538. Filed May 25, 1944. Issued Feb. 15, 1949. 3 claims. Assigned to Interchemical Corporation.

A fire-retarding composition consists of a fireproofing agent selected from the group consisting of chlorinated paraffin, chlorinated naphthalene, and chlorinated diphenyl and from 5 to 50% (based on the total weight of solids in the composition) of a powdered water- and organic solvent-insoluble noncombustible glow-retarding reaction product of an aldehyde with a member of the group comprising urea, thiourea, biuret, guanidine, dicyanodiamide, and melamine. The average diameter of the reaction product

particles ranges from 0.2 to 5 microns. The preparation of the formaldehyde reaction product is described and various formulations are given. C.J.W.

TRUHLAR, JOHN, and PANTSIOS, ATHAN A. Method of flameproofing. U. S. patent 2,461,302. Filed July 28, 1945. Issued Feb. 8, 1949. 1 claim. Assigned to Rudolf F. Hlavaty.

The fireproofing agent is a solution containing 80 parts acetone, 20 parts antimony trichloride, and 8 parts triamyl phosphite. The saturated material is steamed for three to five minutes to convert the chloride to the oxide, exposed to the vapors of ammonia, and dried. The gain in weight is about 30%. C.J.W.

YEAST

ROSENQVIST, SVEN O. Process for the production of yeast. U. S. patent 2,460,947. Filed Jan. 23, 1946. Issued Feb. 8, 1949. 6 claims. Assigned to Svenska Jästfabriks Aktiebolaget.

Torula utilis yeast is grown on a mixture of molasses wort and the still residue from fermented sulfite waste liquor. It is stated that the protein compounds in the molasses have a favorable effect on the color of the resulting yeast. C.J.W.

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